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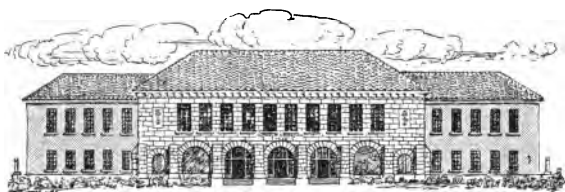
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GRADED EXERCISES
IN ARITHMETIC
SIXTH YEAR - FIRST HALF
JURY-O'CONNELL-SHALLOW



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EXERCISES IN ARITHMETIC

SIXTH YEAR—FIRST HALF

BY

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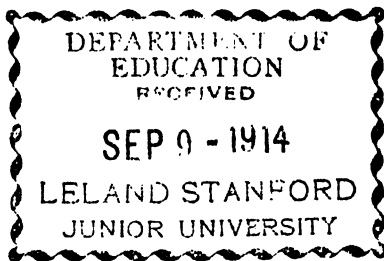
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W. P. 3

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PREFACE

THIS book has been prepared for the purpose of simplifying the study of arithmetic and of fixing its facts in the memory.

It includes work for the first half of the sixth year, divided into five main parts, corresponding to the months of the usual school term. Each of these parts is again divided into twenty groups of problems, corresponding to the usual number of school days in a month. One half of the oral and the written work in each group of problems will require for completion the attention of an average class for about thirty-five or forty minutes.

Each month's work is preceded by an outline of the topics to be studied, in which the new work is distinguished from the rest by being printed in full-faced type.

Provision is made for frequent reviews, including rapid calculations in the fundamental processes and examples in the most important parts of the arithmetic previously studied. By this means a proper perspective of the subject is maintained.

While most of the material has been selected for pupils of average ability, additional problems are given for pupils of advanced standing. These problems can be used also for variety, when pupils are required to go over the grade work a second time.

The language used is simple, clear, and precise. The study of mathematical relations should not be complicated by difficulties of language, nor by distractions introduced through the content of the problems. The problems here given are within the experiences of the children, and are true to conditions of everyday life.

The problems present a gradual increase in difficulty—an arrangement that conduces to steady progress and ease of comprehension. The topics are treated in the order suggested by the most approved courses of study.

THE AUTHORS.

THIS BOOK CONTAINS

RAPID DRILLS

ROMAN NUMBERS

FUNDAMENTAL OPERATIONS

Addition

Subtraction

Multiplication

Division

COMMON FRACTIONS

Reduction

Addition

Subtraction

Multiplication

Division

DECIMAL FRACTIONS

Reduction

Addition

Subtraction

Multiplication

Division

BILLS and CHECKS

DENOMINATE NUMBERS

Reduction

Addition

Subtraction

Multiplication

Division

**COMPARISON OF WEIGHTS AND
MEASURES**

CARPETING

PLASTERING

FENCING

**AREAS OF TRIANGLES, PARAL-
LELOGRAMS, CIRCLES**

**CONTENTS OF BINS AND BAR-
RELS, IN BUSHELS, GALLONS,
ETC.**

PROBLEMS

Finding a part of a number

Finding a number when a frac-
tional part of it is given

Finding what part one number
is of another

Finding a number when the
number plus or minus a frac-
tional part of it is given

PERCENTAGE

The four type problems

SIXTH YEAR—FIRST HALF

FIRST MONTH

RAPID DRILLS—daily.

THE FUNDAMENTAL OPERATIONS—to secure quickness and accuracy.

COMMON FRACTIONS—reviewed.

DECIMAL FRACTIONS—reviewed.

DENOMINATE NUMBERS. Reduction, addition, subtraction, difference in time between two dates.

TABLES—reviewed.

BILLS—reviewed.

PERCENTAGE. Finding per cents of numbers. Finding what per cent one number is of another.

PROBLEMS. To cover the work of the month in common and decimal fractions and tables; also two of the type problems.

I

Oral.

Rapidly add:

150	342	253	164	345	268	283	157	350	416	246
<u>125</u>	<u>126</u>	<u>145</u>	<u>138</u>	<u>272</u>	<u>341</u>	<u>156</u>	<u>234</u>	<u>278</u>	<u>173</u>	<u>167</u>

How many quarts are there in a bushel? in $\frac{1}{2}$ of a bushel? in $\frac{1}{4}$ of a bushel? in $\frac{3}{4}$ of a bushel? in $\frac{1}{8}$ of a bushel? in $\frac{3}{8}$ of a bushel? in $\frac{5}{8}$ of a bushel?

How many pints are there in a gallon? in $\frac{1}{2}$ of a gallon? in $\frac{1}{4}$ of a gallon? in $\frac{3}{4}$ of a gallon? in $\frac{1}{8}$ of a gallon? in $\frac{3}{8}$ of a gallon? in $\frac{5}{8}$ of a gallon?

How many pints are there in $\frac{1}{8}$ of a bushel? in $\frac{7}{8}$ of a bushel? in $\frac{3}{4}$ of a bushel?

1. How many quarts and pints are there in $\frac{3}{4}$ of a peck?
2. How many gills are there in $\frac{1}{2}$ of a quart?
3. How many pints and gills are there in $\frac{7}{8}$ of a quart?
4. A dealer exchanged 8 qt. of oil, at \$1 a quart, for cider worth 25¢ a gallon. How much cider did he get?
5. Howard shot 11 hares, Howell 12, and James 13. How many did they shoot all together?

Rapidly add:

234	456	345	235	321	432	543	524	242	372	536
123	123	234	145	130	256	268	345	156	128	247

How many ounces are there in a pound Troy? in a pound avoirdupois?

How many ounces are there in $\frac{1}{2}$ of a pound Troy? in $\frac{1}{4}$ of a pound Troy? in $\frac{1}{4}$ of a pound avoirdupois? in $\frac{3}{4}$ of a pound avoirdupois?

How many pennyweights are there in $\frac{1}{2}$ of an ounce? in $\frac{3}{4}$ of an ounce? in $\frac{2}{3}$ of an ounce? in $\frac{7}{10}$ of an ounce?

How many grains are there in $\frac{1}{2}$ of a pennyweight? in $\frac{3}{4}$ of a pennyweight? in $\frac{2}{3}$ of a pennyweight? in $\frac{5}{8}$ of a pennyweight?

Which is heavier, an ounce of silver or an ounce of feathers?

6. How many pennyweights are there in $\frac{3}{4}$ of a pound?
7. How many grains are there in $\frac{5}{12}$ of an ounce Troy?
8. How many grains are there in 1 oz. avoirdupois? in 1 oz. Troy?
9. How many ounces are there in $2\frac{1}{2}$ lb. Troy?
10. A merchant sold some rice for \$15, some sugar for \$17, and some molasses for \$22. How much did he receive for all?

Written.

Reduce $\frac{7}{16}$ of a gallon to lower denominations.*

1. Reduce $\frac{7}{16}$ of a bushel to lower denominations.
 2. Reduce $\frac{7}{8}$ of a bushel to lower denominations.
 3. How many hundredweight and pounds are there in $\frac{5}{8}$ of a ton?
 4. Reduce $\frac{7}{8}$ T. to lower denominations.
 5. In 1910 the population of New York City was 4766883; of Philadelphia, 1549008; of St. Louis, 687029; of Baltimore, 558485; and of Pittsburg, 533905. What was the total population of these cities?
-
6. In $\frac{1}{8}$ of a bushel, how many pecks and quarts are there?
 7. Reduce $\frac{1}{3}$ of a gallon to lower denominations.
 8. Reduce $\frac{7}{8}$ of $2\frac{1}{2}$ T. to lower denominations.
 9. Find the cost of 4 gal. of vinegar if 1 qt. costs 12¢.
 10. Reduce $\frac{1}{320}$ to a decimal of six places.

II**Oral.**

Rapidly subtract:

276	342	453	356	268	384	120	160	150	152	163
<u>134</u>	<u>214</u>	<u>234</u>	<u>142</u>	<u>185</u>	<u>226</u>	<u>90</u>	<u>80</u>	<u>60</u>	<u>70</u>	<u>72</u>

Repeat the table of liquid measure. Compare a pint with a quart; a quart with a gallon; a pint with a gallon.

What part of a gallon is a quart? a pint? a gill?

*SUGGESTION: $\frac{7}{16}$ gal. = $\frac{7}{16}$ of 4 qt. = $\frac{7}{4}$ qt. = $1\frac{3}{4}$ qt.

$\frac{3}{4}$ qt. = $\frac{3}{4}$ of 2 pt. = $\frac{3}{2}$ pt. = $1\frac{1}{2}$ pt.

$\frac{1}{2}$ pt. = $\frac{1}{2}$ of 4 gi. = 2 gi.

Ans. 1 qt. 1 pt. 2 gi.

Repeat the table of dry measure. Compare a pint with a bushel; a pint with a peck; a pint with a quart; a quart with a peck. What part of a bushel is a pint?

Repeat the table of Troy * weight. Compare an ounce Troy with an ounce avoirdupois; † a pound Troy with a pound avoirdupois.

How many grains are there in a pound Troy? in a pound avoirdupois? in an ounce Troy? in an ounce avoirdupois?

1. How many grains are there in $2\frac{1}{2}$ pwt.? How many pennyweights and grains are there in $3\frac{1}{2}$ pwt.?

2. Change 12 gal. 3 qt. to pints.

3. Change $\frac{3}{8}$ of a bushel to pecks and quarts.

4. At 72¢ a yard find the cost of $3\frac{1}{8}$ yd. of silk.

5. A man bought a farm for \$6000 and sold it for \$9000. How many dollars did he gain?

Rapidly subtract:

110	140	140	120	240	370	378	456	367	130	260
<u>50</u>	<u>90</u>	<u>97</u>	<u>35</u>	<u>127</u>	<u>156</u>	<u>154</u>	<u>270</u>	<u>240</u>	<u>76</u>	<u>92</u>

Repeat the table of English money. Compare a penny with a shilling; a shilling with a pound sterling; a pound or sovereign with a dollar. What is the difference between the pound and the sovereign? Which is the gold

* The term *Troy* is said to be derived from *Troyes*, the name of a town in France, where the weight was first used in Europe.

† The term *avoirdupois* is derived from the French *avoir du poids*, signifying *to have weight*. An avoirdupois pound consists of 7000 Troy grains,

piece and which is the paper money? How many shillings are there in a guinea? *

6. How many shillings and pence are there in $\frac{3}{8}$ of a pound sterling?

7. Reduce $5\frac{3}{4}$ shillings to shillings and pence.

8. What part of 16 pence is $\frac{3}{8}$ of a shilling?

9. At 2000 lb. to the ton, how many pounds are there in $4\frac{1}{2}$ T.?

10. I bought a horse for \$175, paid \$25 for its keeping, and sold it for \$250. What was my gain?

Written.

1. Reduce $\text{£}4\frac{1}{8}$ to lower denominations.

2. Change $\frac{5}{8}$ sq. rd. to lower denominations.

3. How many hours and minutes are there in $\frac{3}{8}$ of a day?

4. Reduce $\frac{1}{128}$ bu. to the fraction of a pint.

5. Reduce $.016\frac{2}{3}$ to a common fraction.

6. Reduce $\text{£}\frac{2}{3}$ to lower denominations.

7. How many hundredweight and pounds are there in $\frac{5}{16}$ T.?

8. Reduce $\frac{5}{16}$ of a bushel to lower denominations.

9. I bought 40 bu. of grain at the rate of $3\frac{1}{2}$ bu. for \$3.50. What was the cost?

10. From $.57\frac{1}{8}$ take $.002\frac{1}{4}$.

* The guinea is so called because the gold of which it was first made came from Guinea in Africa. It is worth 21 shillings.

III

Oral.

Rapidly multiply:

700×7	400×6	300×12	700×4	400×15
600×5	900×4	400×13	900×3	300×18
900×5	500×7	300×14	800×7	700×12
600×8	800×9	700×9	500×9	800×14
1400×6	1200×8	1500×4	1600×5	1600×8

For what is avoirdupois' weight used? Troy weight? A pound avoirdupois contains how many grains? a pound Troy? Repeat both tables.

Compare an ounce avoirdupois with an ounce Troy.

How many grains are there in 1 ounce Troy? How many ounces are there in 480 grains? How many ounces are there in .5 of a pound?

1. How many pecks are there in .4 of a bushel?
2. Reduce .4 of a day to lower denominations.
3. How many shillings are there in .6 of a pound sterling?
4. Reduce $\frac{4}{3}$ of a yard to feet and inches.
5. A man, having $\frac{3}{4}$ of a barrel of flour, bought $\frac{1}{4}$ of a barrel more. How much had he then?

Rapidly multiply:

27×7	120×3	48×5	140×2	68×5
84×9	240×4	87×4	160×3	77×4
63×8	130×6	96×3	150×7	26×8
45×7	150×5	45×7	230×3	43×8
63×6	160×8	56×6	240×5	59×9

How many inches are there in a yard? in a foot?

Compare an inch with a foot; with a yard.

How many times a rod is a mile? What part of a mile is a yard? a foot?

Repeat the table of long or linear measure.

- What part of a yard is 2 ft.? of a yard is 4 in.? of a mile is 32 rd.?

In measuring the height of horses what denomination is used? How many inches equal a hand? How many feet equal a pace? For what is the pace used? For what is the fathom used? How many feet equal a fathom?

6. Find the cost of 2 qt. of milk at 5¢ a pint.

7. How much will 2 cwt. of coffee cost, at the rate of 3 lb. for 90¢?

8. My horse is 84 in. high. How many hands high is it?

9. Find the cost of 1100 yd. of fence, at \$5 a rod.

10. Reduce 1 wk. 3 da. 20 hr. to hours.

Written.

Reduce 5.645 lb. Troy to lower denominations.*

1. Reduce £ 325 to lower denominations.

2. How many feet and inches are there in .9 yd.?

* SUGGESTION: 5.645, number of pounds

12
7.749, number of ounces

20
14.89, number of pennyweights

24
19.2, number of grains

Ans. 5 lb. 7 oz. 14 pwt. 19.2 gr.

3. Change .645 da. to lower denominations.
 4. Reduce .35 lb. avoirdupois to lower denominations.
 5. Reduce $\frac{7}{8}$ mi. to lower denominations.
-
6. Reduce 6.875 gal. to gallons and lower denominations.
 7. Change 8.0205 bu. to bushels and lower denominations.
 8. How many pounds, pennyweights, and grains are there in 6.013 lb.?
 9. How many pecks, quarts, and pints are there in $\frac{1}{2}$ of a bushel?
 10. How much will 580.5 lb. cost at 9¢ a pound?

IV

Oral.

Rapidly divide :

2800 by 7	2400 by 60	4800 by 800	4500 by 900
6300 by 9	4500 by 50	4900 by 700	2400 by 800
7200 by 8	3200 by 40	4800 by 600	5400 by 900
2100 by 3	5600 by 70	2400 by 400	7200 by 600
2400 by 6	7200 by 80	4200 by 600	4800 by 300

How can you reduce a fraction of a bushel to pecks? a fraction of a peck to quarts? a fraction of a quart to pints? Reduce $\frac{3}{4}$ bu. to lower denominations. Reduce .3 gal. to lower denominations.

What is the unit of measure in the table of United States money? in English money? in Troy weight and in avoirdupois weight?

What kind of numbers are numbers like \$5, £3, 7 lb., 5 yd.?

What is a denominate number?

What is the difference between a simple denominate number and a compound denominate number?

1. Reduce .5 of a rod to yards, feet, and inches.
2. Change .25 of a bushel to lower denominations.
3. In .6 of an hour how many minutes are there?
4. Reduce $\frac{3}{4}$ of a day to lower denominations.
5. If 42 sheep are sold for \$108, for how much are 7 sheep sold?

Rapidly divide:

216 by 8	208 by 26	315 by 7	288 by 32
297 by 9	504 by 63	291 by 3	756 by 84
312 by 4	340 by 68	378 by 6	469 by 67
245 by 5	189 by 27	141 by 3	576 by 64
352 by 8	308 by 77	116 by 4	256 by 32

6. In .7 of a ton how many hundredweight are there?
7. In 5% of a bushel how many pints are there?
8. Change $\frac{1}{2}$ of a gallon to lower denominations.
9. Jane having 27 roses gave $\frac{1}{3}$ of them to Mary and $\frac{1}{4}$ of them to Annie. How many had she remaining?
10. How much will 2 reams of sandpaper cost, at 22¢ a quire?

Written.

1. Reduce .0927 of a ton to lower denominations.
2. Reduce .91875 of a ton to lower denominations.
3. Change £.555 to lower denominations.

4. In $2\frac{3}{16}$ lb. Troy, how many pounds, ounces, and pennyweights are there?

5. The dividend is $18\frac{1}{2}$, the divisor is .0025. Find the quotient.

6. Reduce .55 lb. avoirdupois to ounces.

7. How many shillings, pence, and farthings are there in £.673?

8. Change 16.90471 T. to tons and lower denominations.

9. The dividend is $48\frac{1}{4}$, the divisor is 2500. What is the quotient?

10. A man bought paper at \$1.50 a ream and sold it at 12 sheets for 5¢. How much did he gain per ream?

V

Oral.

Rapidly find the results:

307 + 268	379 - 360	426 × 2	654 ÷ 2
702 + 111	483 - 123	316 × 3	864 ÷ 4
607 + 73	740 - 360	215 × 4	126 ÷ 3
803 + 124	860 - 270	113 × 5	328 ÷ 4
700 + 99	154 - 62	644 × 2	363 ÷ 3

1. Reduce .75 of a pound Troy to lower denominations.

2. Reduce $\frac{3}{4}$ of a gallon to lower denominations.

3. If 5 pitchers cost \$3, how much will 45 pitchers cost at the same rate?

4. The dividend is .25, the divisor is 50. Find the quotient.

5. How many feet high is a horse which measures $15\frac{1}{2}$ hands? _____

Rapidly find the results:

$324 + 256$	$468 - 270$	273×2	$642 \div 3$
$256 + 123$	$523 - 210$	216×3	$375 \div 5$
$537 + 152$	$428 - 250$	375×5	$138 \div 2$
$498 + 245$	$642 - 375$	138×4	$284 \div 4$
$257 + 245$	$275 - 138$	156×6	$426 \div 6$

6. Change $\frac{5}{8}$ of a pound avoirdupois to lower denominations.

7. How many hours and minutes are there in .6 of a day?

8. How far will a man travel in 48 da., if he travels 30 mi. in 4 da.?

9. The dividend is .48, the divisor is 60. Find the quotient.

10. A vessel was sunk in 8 fathoms of water. How many feet deep was it?

Written.

1. Reduce £.512 to lower denominations.
2. Change 2.06 bu. to bushels, quarts, and pints.
3. Reduce $\frac{7}{8}$ gal. to lower denominations.
4. Change $2\frac{1}{2}$ lb. Troy to lower denominations.
5. The dividend is .032 and the divisor 400. Find the quotient.

6. In $\frac{3}{4}$ yd. how many feet and inches are there?
7. Reduce $5\frac{1}{2}$ rd. to rods and lower denominations.
8. Reduce .659 of a week to integers of lower denominations.
9. Change 5.625 bu. to bushels and lower denominations.
10. The dividend is 4800 and the divisor is .06. Find the quotient.

VI

Oral.

Rapidly change to the next lower denomination:

10 gal.	$\frac{1}{2}$ gal.	.4 gal.	$2\frac{1}{2}$ ft.	£ 1.5
5 bu.	$\frac{1}{2}$ bu.	.2 bu.	$1\frac{1}{2}$ yd.	2.5 gal.
8 qt.	$\frac{1}{2}$ qt.	.5 qt.	$2\frac{1}{4}$ bu.	1.4 qt.
6 pk.	$\frac{1}{2}$ pk.	.6 pk.	$3\frac{1}{2}$ gal.	2.4 bu.
9 yd.	$\frac{1}{4}$ yd.	.3 yd.	$1\frac{1}{2}$ pk.	1.6 pk.

How many pints are there in a bushel? What part of a bushel is 1 pint? 4 pints? 8 pints? What part of a bushel is 1 quart and 2 pints? 1 quart and 6 pints? 2 quarts and 4 pints?

How many pints are there in a gallon? What part of a gallon is 1 pint? 2 pints? 4 pints?

What part of a gallon is 1 quart and 1 pint? 2 quarts and 1 pint? 1 quart and 2 pints?

1. Reduce 3 qt. 1 pt. to the fraction of a gallon.
2. Change 3 pk. 4 qt. to the fraction of a bushel.
3. What fraction of a bushel is 1 pk. 4 qt.?
4. One foot and nine inches is what fraction of a yard?
5. If $\frac{3}{4}$ of a bushel of apples is worth \$2.40, how much will a quart be worth? _____

Rapidly change to the next higher denomination :

328 pk.	456 pt.	880 yd.	645 rd.	85 pk.
484 in.	320 oz.	240 oz.	562 da.	96 qt.
990 ft.	7000 lb.	762 ¢	480 hr.	87 pt.
550 yd.	1760 yd.	£ 250	568 wk.	32 ft.
168 qt.	8000 lb.	360s.	300 pwt.	76 in.

How is a denominate number changed to a lower denomination?

How is a denominate number changed to a higher denomination?

6. What fraction of a bushel is 1 pk. 1 qt. 1 pt.?
7. Reduce .9 yd. to lower denominations.
8. Change $\frac{3}{8}$ lb. Troy to lower denominations.
9. How many feet are there in 724 in.?
10. If $2\frac{1}{2}$ yd. cost \$1 $\frac{1}{4}$, how many yards can be bought for \$7?

Written.

What fraction of a gallon is 2 qt. 1 pt. 3 gi. ? *

1. What fraction of a bushel is 3 pk. 1 pt.?
2. What fraction of a bushel is 3 qt. 1 pt.?
3. Change 1 qt. 1 gi. to the fraction of a gallon.
4. What fraction of a pound Troy is 10 oz. 18 pwt. 9 gr.?
5. How much will 1684 lb. of beef cost at \$9.37 $\frac{1}{2}$ per C.?

* SUGGESTION: $\frac{2 \text{ qt. } 1 \text{ pt. } 3 \text{ gi.}}{1 \text{ gal.}} = \frac{23 \text{ gi.}}{32 \text{ gi.}}$

Ans. $\frac{23}{32}$

6. Change 5 oz. 6 pwt. 16 gr. to the fraction of a pound.
7. What fraction of a day is 8 hr. 10 min. 20 sec.?
8. What fraction of a pound is 10 oz. 6 dr.?
9. Reduce $\frac{3}{16}$ of a mile to lower denominations.
10. Change $\frac{11}{8}$ to a decimal of four places.

VII

Oral.

Rapidly change to the next higher denomination :

45 qt.	120 rd.	15 pwt.	600 rd.	87 <i>f</i> .
17 pt.	262 ft.	15 gr.	120 ft.	26 <i>d</i> .
83 gi.	440 yd.	300 pwt.	486 oz.	15 <i>s</i> .
24 qt.	724 in.	15 oz.	240 gr.	60 <i>f</i> .
92 pk.	1760 yd.	120 gr.	420 rd.	10 <i>d</i> .

1. 6 qt. 1 pt. is what fraction of a peck?
2. What fraction of a pound sterling is 10*s*. 4*d*.?
3. .125 gal. = how many pints?
4. Reduce $\frac{4}{7}$ of a week to days and hours.
5. Change $\frac{1}{12}$ to thousandths.

Rapidly change to the next lower denomination:

8 oz.	$\frac{1}{2}$ pk.	.2 wk.	$1\frac{1}{2}$ pk.	2.2 wk.
10 pt.	$\frac{1}{4}$ qt.	.5 da.	$2\frac{1}{4}$ qt.	1.5 da.
5 oz.	$\frac{3}{8}$ gal.	.6 hr.	$1\frac{3}{8}$ gal.	1.6 hr.
7 lb.	$\frac{3}{4}$ qt.	£ .5	$1\frac{3}{4}$ qt.	£ 2.5
9 bu.	$\frac{1}{3}$ pt.	.4 <i>d</i> .	$2\frac{2}{3}$ pt.	5.4 da.

6. Change 5 qt. 1 pt. to the fraction of a peck.
7. What part of a gallon is 1 pt. 3 gi.?

8. How many grains and pennyweights are there in $\frac{1}{8}$ of an ounce?
9. Reduce $\frac{4}{7\frac{1}{2}}$ to a simple fraction.
10. Reduce $\frac{1}{1\frac{1}{8}}$ to a decimal.

Written.

1. What fraction of $2\frac{1}{2}$ T. is 180 lb.?
 2. What fraction of £ 2 is 5s. 8d. 3f.?
 3. What part of 2 gal. 3 qt. 1 pt. is 1 pt. 3 gi.?*
 4. What fraction of 2 T. 7 cwt. 28 lb. is 5 cwt. 91 lb.?
 5. Reduce $2\frac{3}{4} \times \frac{2}{1\frac{1}{25}}$ to a decimal.
-
6. What part of a cubic yard is 24 cu. ft. 1080 cu. in.?
 7. What part of an acre is 45 sq. rd. 20 sq. yd.?
 8. Reduce 5 cwt. 4 lb. to the fraction of a ton.
 9. Reduce .83 A. to lower denominations.
 10. What is the cost of a load of hay weighing 2280 lb. at \$18.50 a ton?

VIII**Oral.**

Rapidly reduce to simple fractions :

$\frac{1 \text{ qt. } 1 \text{ pt.}}{1 \text{ gal.}}$	$\frac{1 \text{ qt. } 1 \text{ pt.}}{1 \text{ pk.}}$	$\frac{1 \text{ pk. } 1 \text{ qt.}}{1 \text{ bu.}}$	$\frac{1 \text{ oz. } 1 \text{ pwt.}}{1 \text{ lb.}}$
$\frac{1 \text{ qt. } 1 \text{ pt.}}{2 \text{ gal.}}$	$\frac{2 \text{ qt. } 1 \text{ pt.}}{2 \text{ pk.}}$	$\frac{1 \text{ pk. } 2 \text{ qt.}}{1 \text{ bu.}}$	$\frac{2 \text{ pk. } 2 \text{ qt.}}{2 \text{ bu.}}$

* SUGGESTION : $\frac{1 \text{ pt. } 3 \text{ gi.}}{2 \text{ gal. } 8 \text{ qt. } 1 \text{ pt.}} = \frac{? \text{ gi.}}{? \text{ gi.}}$

What fraction of a peck is a pint? What decimal part of a peck is a pint? What decimal part of a yard is a foot? of a foot is an inch? of 2 ft. is 6 in.?

What per cent of a quart is a pint? of a pint is a gill? of a foot is an inch? of 2 bu. is 3 pk.? of a square yard is a square foot?

1. Change 48 min. to the decimal of an hour.
2. Find what per cent of a yard 1 ft. 6 in. is.
3. Change 8 min. 20 sec. to the fraction of an hour.
4. What per cent of an hour is a minute?
5. If chestnuts are sold at the rate of $16\frac{2}{3}$ ¢ per pound, how much will 12 lb. be worth?

Rapidly reduce to simple fractions:

$\frac{6 \text{ in.}}{1 \text{ ft. } 2 \text{ in.}}$	$\frac{1 \text{ qt.}}{1 \text{ pk. } 1 \text{ qt.}}$	$\frac{2 \text{ pk.}}{1 \text{ bu. } 3 \text{ pk.}}$	$\frac{1 \text{ qt. } 1 \text{ pt.}}{5 \text{ qt. } 1 \text{ pt.}}$
$\frac{2 \text{ ft.}}{3 \text{ yd. } 1 \text{ ft.}}$	$\frac{1 \text{ ft. } 1 \text{ in.}}{1 \text{ yd. } 1 \text{ ft.}}$	$\frac{5 \text{ qt.}}{2 \text{ pk.}}$	$\frac{1 \text{ pk. } 1 \text{ qt.}}{1 \text{ bu. } 4 \text{ pk.}}$

6. What fractional part of an hour is 12 min.? 15 min.?
7. What decimal part of a yard is 8 in.?
8. How many months are there in $\frac{3}{4}$ of a year?
9. At 80¢ a pound, how much will 4 oz. of tea cost?
10. I sold a book for 40¢ which cost me 48¢. What part of my money was lost?

Written.

Change £6 9s. 3d. 2f. to pounds sterling and decimal of a pound.*

1. Change £6 5s. 8d. 3f. to pounds sterling and decimal of a pound.

2. Change £10 17s. 6d. 1f. to pounds sterling and decimal of a pound.

3. Change £6 17s. 9d. 3f. to pounds sterling and decimal of a pound.

4. What fraction of 5 oz. is 2 pennyweights? Reduce the answer to a decimal.

5. I paid \$1837½ for 3675 bu. of oats. How much were they a bushel? _____

6. Change 5 lb. 8 oz. 16 pwt. 22 gr. to pounds and the decimal of a pound.

7. Change 4 lb. 9 oz. 17 pwt. 16 gr. to pounds and the decimal of a pound.

8. Change 2 pk. 6 qt. to the decimal of a bushel.

9. Change 1 gal. 1 qt. 1 pt. to the decimal of a gallon.

10. If 7 bbl. contain 313¼ gal. of oil, how many gallons of oil will 3½ bbl. of the same size contain?

$$\text{* SUGGESTION: } \frac{9s. \ 3d. \ 2f.}{£1} = \frac{446f.}{960f.} = \frac{223}{480} = .4645 + \quad \text{Ans. } £6.4645 +$$

Or,

4)2.0,	number of farthings	
12)3.5000,	number of pence	
20)9 × 2016,	number of shillings	
6.4645 +,	number of pounds	Ans. £6.4645.

IX

Oral.

Rapidly find the sums :

$\frac{1}{2} + \frac{1}{3}$

$\frac{1}{3} + \frac{1}{4}$

$\frac{1}{4} + \frac{1}{5}$

$\frac{1}{2} + \frac{2}{3}$

$\frac{1}{2} + \frac{1}{4}$

$\frac{1}{3} + \frac{1}{5}$

$\frac{1}{4} + \frac{1}{6}$

$\frac{1}{2} + \frac{5}{6}$

$\frac{1}{2} + \frac{1}{5}$

$\frac{1}{3} + \frac{1}{6}$

$\frac{1}{2} + \frac{3}{4}$

$\frac{1}{3} + \frac{2}{3}$

$\frac{1}{2} + \frac{1}{6}$

$\frac{1}{2} + \frac{2}{3}$

$\frac{1}{2} + \frac{2}{5}$

$\frac{1}{3} + \frac{2}{5}$

1. What per cent of a ton is 80 lb.?
2. What per cent of a bushel is 1 pk. 4 qt.?
3. Reduce 1500 lb. to the fraction of a ton.
4. What part of $3\frac{1}{2}$ is $2\frac{1}{2}$?
5. At the rate of $4\frac{1}{2}$ yd. of silk for $\$13\frac{1}{2}$, what part of a yard can be bought for 75 ¢?

Rapidly find the sums :

$\frac{1}{3} + \frac{2}{5}$

$\frac{1}{4} + \frac{4}{5}$

$\frac{1}{2} + \frac{3}{7}$

$\frac{1}{2} + \frac{1}{3}$

$\frac{1}{4} + \frac{3}{8}$

$\frac{1}{4} + \frac{5}{8}$

$\frac{1}{2} + \frac{4}{7}$

$\frac{1}{4} + \frac{3}{8}$

$\frac{1}{4} + \frac{2}{5}$

$\frac{1}{2} + \frac{1}{7}$

$\frac{1}{2} + \frac{5}{7}$

$\frac{1}{4} + \frac{5}{8}$

$\frac{1}{4} + \frac{3}{5}$

$\frac{1}{2} + \frac{2}{7}$

$\frac{1}{2} + \frac{6}{7}$

$\frac{1}{4} + \frac{7}{8}$

6. Reduce 3 qt. 1 pt. to the per cent of a gallon.
7. Change 2 ft. 3 in. to the fraction of a yard.
8. In $\frac{2}{3}$ of a day how many hours are there?
9. What part of $\frac{2}{3}$ is $\frac{3}{4}$?
10. At the rate of $\$8\frac{2}{3}$ for $1\frac{3}{4}$ yards, how much will $\frac{3}{8}$ of a yard cost?

Written.

1. Change 9 T. 16 cwt. 35 lb. to tons and the decimal of a ton.
2. Change 8 T. 16 cwt. 58 lb. to tons and the decimal of a ton.
3. Change 87 rd. 10 ft. to the decimal of a mile.
4. How many pecks, quarts, and pints are there in $\frac{7}{8}$ of a bushel?
5. If 96880 lb. of coal are worth \$121.10, how much will a ton cost? _____
6. Change 6 qt. 1 pt. to the decimal of a peck.
7. Change 3 T. 12 cwt. 38 lb. to tons and the decimal of a ton.
8. Change 6 oz. 10 pwt. 4 gr. to the decimal of a pound.
9. How many rods, feet, and inches are there in .016 of a mile?
10. Find the cost of $5\frac{1}{4}$ yd. if $7\frac{1}{2}$ yd. cost $\$3\frac{3}{4}$.

X**Oral.**

Rapidly find the remainders:

$\frac{1}{2} - \frac{1}{3}$	$\frac{1}{3} - \frac{1}{4}$	$\frac{2}{3} - \frac{1}{5}$	$\frac{1}{4} - \frac{1}{5}$
$\frac{1}{2} - \frac{1}{4}$	$\frac{1}{3} - \frac{1}{5}$	$\frac{2}{3} - \frac{2}{5}$	$\frac{2}{4} - \frac{2}{5}$
$\frac{1}{2} - \frac{1}{5}$	$\frac{1}{3} - \frac{1}{5}$	$\frac{2}{4} - \frac{1}{3}$	$\frac{2}{4} - \frac{2}{5}$
$\frac{1}{2} - \frac{1}{5}$	$\frac{2}{3} - \frac{1}{4}$	$\frac{2}{4} - \frac{1}{3}$	$\frac{2}{4} - \frac{1}{5}$

1. Reduce $\frac{1}{4}$ of a yard to lower denominations.
2. Change 2.5 ft. to feet and inches.

3. What fraction of a day is 6 hr.?
 4. A boy sleeps 6 hr. a day. What per cent of a day is he awake?
 5. How far will a man drive in $5\frac{1}{2}$ hr. at the rate of 21 mi. in $3\frac{1}{2}$ hr.?
-

Rapidly find the remainders:

$\frac{3}{4} - \frac{2}{16}$	$\frac{3}{5} - \frac{2}{16}$	$\frac{3}{5} - \frac{1}{6}$	$\frac{7}{8} - \frac{3}{4}$
$\frac{5}{6} - \frac{1}{12}$	$\frac{3}{4} - \frac{2}{8}$	$\frac{5}{6} - \frac{3}{8}$	$\frac{3}{8} - \frac{3}{8}$
$\frac{4}{7} - \frac{3}{14}$	$\frac{3}{4} - \frac{3}{8}$	$\frac{3}{4} - \frac{2}{8}$	$\frac{5}{6} - \frac{4}{6}$
$\frac{3}{8} - \frac{1}{8}$	$\frac{5}{6} - \frac{1}{2}$	$\frac{4}{5} - \frac{1}{2}$	$\frac{7}{12} - \frac{1}{6}$

6. Change $\text{£} \frac{1}{3}$ to shillings and pence.
7. Reduce 2.4 pk. to lower denominations.
8. Half a peck of oats is what part of a bushel?
9. What decimal part of a gallon is 2 qt. and 1 pt.?
10. If 6 bbl. of flour cost \$33, how much will 4 bbl. cost? (Use the ratio method.)

Written.

1. Reduce $\frac{3}{4}$ of a month to lower denominations.
 2. Reduce .78125 lb. Troy to lower denominations.
 3. What part of a day is 10 hr. 40 min.?
 4. Change 5 lb. 8 oz. 12 pwt. 22 gr. to pounds and the decimal of a pound.
 5. How much will $8\frac{1}{2}$ yd. of linen cost if $5\frac{1}{2}$ yd. cost \$2.76?
-

6. Reduce $\frac{3}{8}$ of a mile to lower denominations.
7. Reduce 6.13 lb. Troy to lower denominations.
8. What fractional part of 5 yd. 2 in. is 2 yd. 1 ft.?
9. Reduce £9 13s. 9d. 2f. to pounds and a decimal of a pound.
10. How much will $8\frac{1}{2}$ yd. of silk cost if $5\frac{3}{4}$ yd. cost \$11 $\frac{1}{2}$?

XI

Oral.

Rapidly find the products:

$\frac{1}{2} \times \frac{1}{3}$

$\frac{2}{3} \times \frac{3}{4}$

$\frac{1}{3} \times \frac{2}{5}$

$\frac{1}{4} \times \frac{4}{5}$

$\frac{1}{2} \times \frac{2}{3}$

$\frac{1}{2} \times \frac{1}{4}$

$\frac{1}{2} \times \frac{2}{3}$

$\frac{2}{3} \times \frac{3}{4}$

$\frac{1}{3} \times \frac{1}{4}$

$\frac{1}{2} \times \frac{3}{4}$

$\frac{1}{4} \times \frac{1}{5}$

$\frac{1}{2} \times \frac{4}{5}$

$\frac{1}{3} \times \frac{3}{4}$

$\frac{1}{3} \times \frac{1}{5}$

$\frac{2}{3} \times \frac{1}{5}$

$\frac{2}{3} \times \frac{3}{4}$

Count by 4's from 4 to 48 and back ; from 3 to 43 and back ; from 2 to 42 and back.

1. At 10¢ a peck, how many bushels of apples can be bought for \$8?
 2. Which costs more, and how much more, 5 bu. 3 qt. of salt at 4¢ a quart, or 10 bu. 3 pk. of apples at 50¢ a bushel?
 3. How much will 4 tablespoons cost at the rate of \$11.52 a gross?
 4. How many $\frac{1}{2}$ pt. bottles will 2 gal. of writing fluid hold?
 5. How many hands tall is a horse that is 5 ft. tall?
-

Rapidly find the products :

$$\frac{3}{4} \times \frac{5}{8}$$

$$\frac{1}{5} \times \frac{4}{7}$$

$$\frac{5}{6} \times \frac{7}{8}$$

$$\frac{3}{5} \times \frac{5}{9}$$

$$\frac{3}{5} \times \frac{5}{8}$$

$$\frac{1}{5} \times \frac{4}{7}$$

$$\frac{3}{10} \times \frac{5}{8}$$

$$\frac{6}{7} \times \frac{3}{4}$$

$$\frac{3}{4} \times \frac{5}{9}$$

$$\frac{3}{8} \times \frac{3}{8}$$

$$\frac{3}{4} \times \frac{1}{16}$$

$$\frac{3}{4} \times \frac{7}{9}$$

$$\frac{3}{8} \times \frac{7}{8}$$

$$\frac{1}{4} \times \frac{5}{8}$$

$$\frac{3}{4} \times \frac{7}{8}$$

$$\frac{3}{4} \times \frac{1}{12}$$

To 10 add 3, subtract 2, add 4, subtract 3, add 5, subtract 4, add 6, subtract 5, add 7, subtract 6, and give the result.

6. When apples sell at 20¢ a peck, how much are they worth a bushel ?

7. If it takes 6 buttons for one shirt, how many shirts will 2 gross of buttons trim ?

8. The distance across a city park is 132 paces. How many rods across is it ?

9. Jane picked a peck of cherries and sold them at 4¢ a pint. How much did she receive for them ?

10. A vessel sails 4 leagues an hour. How many hours will it take to sail 120 miles ?

Written.

1. Add : 76453

34758

98312

22496

85234

33877

62648

48962

2. A merchant sold $46\frac{3}{4}$ yd. of cloth for \$127 $\frac{3}{4}$, $64\frac{5}{8}$ yd. for \$226 $\frac{3}{8}$, and $76\frac{1}{2}$ yd. for \$312 $\frac{1}{2}$. How many yards did he sell, and how much money did he receive ?

3. In 1909 the wheat crop of the United States amounted to 737189000 bu. There were 46723-000 A. under cultivation. What

was the average yield per acre ?

4. The entire wheat crop of the world in 1909 was 3624418000 bu., and the United States raised 737189-000 bu. How many bushels were raised by all the other countries? About what per cent of the whole amount was raised in the United States?

5. One year Montana produced 30820000 lb. of wool. Since this was $\frac{1}{7}$ of the total production of the United States that year, how much did all the states produce?

- | | |
|----------------|--|
| 6. Add: 777534 | 7. If a skirt requires $3\frac{1}{4}$ yd. |
| 543734 | of lawn at 24¢ a yard, $4\frac{1}{4}$ yd. of |
| 789968 | embroidery at 20¢ a yard, but- |
| 821168 | tons, thread, etc., worth 17¢, and |
| 862998 | the cost of labor is 48¢ each, at |
| 554449 | what price per dozen must a manu- |
| 734756 | facturer sell these skirts to make |
| <u>966837</u> | $\frac{1}{8}$ of the total cost? At what price |
| | apiece must a retailer, who buys a |

dozen of these skirts, sell them in order to make 75¢ on each skirt?

8. Henry had $2\frac{1}{4}$ A. of potatoes from which he gathered 330 bu. How many bushels would $5\frac{1}{4}$ A. yield at the same rate?

9. $\frac{6}{11}$ of $13\frac{1}{4}$ is $\frac{6}{18}$ of what number?

10. A horse was sold for $\frac{7}{8}$ of its cost. If the selling price was \$2100, what was the cost?

XII

Oral.

Rapidly find the quotients:

$\frac{1}{4} \div \frac{1}{2}$	$\frac{1}{2} \div \frac{1}{3}$	$\frac{2}{3} \div \frac{2}{3}$	$\frac{5}{8} \div \frac{5}{8}$	$\frac{7}{8} \div \frac{7}{8}$	$\frac{14}{9} \div \frac{2}{3}$	$\frac{2}{3} \div \frac{2}{3}$	$\frac{6}{7} \div \frac{2}{3}$
$\frac{1}{2} \div \frac{1}{4}$	$\frac{1}{3} \div \frac{1}{2}$	$\frac{2}{4} \div \frac{2}{3}$	$\frac{5}{8} \div \frac{2}{3}$	$\frac{11}{8} \div \frac{2}{3}$	$\frac{13}{10} \div \frac{2}{5}$	$\frac{2}{5} \div \frac{2}{3}$	$\frac{2}{3} \div \frac{5}{6}$

1. A boy bought $\frac{1}{2}$ doz. sets of skates at \$9.60 a dozen. For how much shall he sell them all to gain 20¢ apiece?
2. A grocer paid \$6.40 for a bushel of cranberries. For how much a quart shall he sell them to gain 2¢ a pint?
3. What number is that which being increased by $\frac{2}{5}$ of itself will become 40?
4. A, having $\frac{2}{3}$ of a dollar, gave $\frac{1}{2}$ of it to B, and $\frac{1}{4}$ of it to C. What part of a dollar did each then have?
5. Mr. Jones has 60 fruit trees, $\frac{2}{5}$ of which bear peaches, $\frac{2}{3}$ of the remainder pears, and the remainder apples. How many are there of each?

Rapidly find the quotients:

$\frac{5}{8} \div \frac{5}{12}$	$\frac{2}{3} \div \frac{5}{8}$	$\frac{5}{8} \div \frac{5}{8}$	$1\frac{1}{2} \div \frac{2}{3}$
$\frac{7}{9} \div \frac{2}{3}$	$\frac{5}{9} \div \frac{2}{3}$	$\frac{2}{3} \div \frac{2}{3}$	$2\frac{1}{2} \div \frac{5}{8}$
$\frac{2}{3} \div \frac{5}{16}$	$\frac{2}{3} \div \frac{2}{3}$	$\frac{5}{8} \div \frac{5}{8}$	$1\frac{1}{3} \div \frac{2}{3}$
$\frac{7}{8} \div \frac{2}{16}$	$\frac{2}{3} \div 1\frac{1}{9}$	$\frac{5}{8} \div \frac{5}{8}$	$2\frac{1}{3} \div \frac{7}{9}$

6. A dealer bought paper collars at 40¢ a box, each box containing a dozen. How much did he gain on each collar by selling them at the rate of 5¢ apiece?
7. Two fifths of a certain number being increased by $\frac{1}{2}$ of the number, equals 27. What is the number?
8. A boy, after giving away $\frac{1}{3}$ of his kite string, had only 60 ft. remaining. How much string had he at first?
9. If $\frac{2}{3}$ of a yard of cloth costs $\frac{2}{3}$ of a dollar, how much should $\frac{2}{3}$ of a yard cost?
10. If 5 men earn \$30 in a certain time, how much will 8 men earn at the same rate, in one half the time?

Written.

1. Change .75 of a pint to the decimal of a gallon.
 2. Reduce 6856 in. to rods, yards, feet, and inches.
 3. How many inches are there in 3 mi. 265 rd. 7 in.?
 4. What part of 5 gal. is 3 gal. 3 qt. 1 pt.?
 5. How much will $9\frac{3}{4}$ bbl. cost if $6\frac{3}{4}$ bbl. are worth \$12.42.
-
6. Reduce .125 sq. yd. to lower denominations.
 7. Change 4 T. 19 cwt. 83 lb. to tons and the decimal of a ton.
 8. Change $\frac{1}{2}$ of a gallon to lower denominations.
 9. What decimal of a bushel does 3 pk. 6 qt. 1 pt. equal?
 10. $12\frac{3}{4}$ is 4.5 times what number?

XIII**Oral.**

Rapidly add:

$\frac{2}{10}$ and $\frac{5}{10}$; $\frac{2}{10}$ and $\frac{4}{10}$; $\frac{2}{10}$ and $\frac{6}{10}$; $\frac{2}{10}$ and $\frac{5}{100}$; $\frac{2}{10}$ and $\frac{6}{100}$; $\frac{4}{10}$ and $\frac{5}{100}$; $\frac{8}{100}$ and $\frac{6}{10}$.

.2	.3	.7	.25	.24	3.5	1.25	8.4	2.7	.38	.6	1.84
<u>.05</u>	<u>.06</u>	<u>.4</u>	<u>.06</u>	<u>.12</u>	<u>1.2</u>	<u>.38</u>	<u>2.8</u>	<u>1.2</u>	<u>.25</u>	<u>.27</u>	<u>1.23</u>

1. A dealer sold 5 gal. 2 qt. of milk to one customer and 3 gal. 1 qt. to another. How many gallons and quarts did he sell to both?
2. I bought $\frac{1}{4}$ bu. of peaches from one grocer and $\frac{1}{2}$ pk. from another. How many pecks and quarts did I buy all together?

3. $12\frac{1}{2}\%$ of 1 bu. is how many quarts?

4. What part of 2 pk. is $\frac{1}{2}$ pk.?

5. $33\frac{1}{8}\%$ of 96 pt. is how many pecks?

Rapidly add :

.5	.6	.56	.07	2.7	1.005	3.7	.45	1.5	3.2	4.7	1.25
<u>.12</u>	<u>.5</u>	<u>.12</u>	<u>.04</u>	<u>1.5</u>	<u>.28</u>	<u>2.6</u>	<u>.26</u>	<u>.07</u>	<u>2.8</u>	<u>2.4</u>	<u>1.13</u>

6. How many quarts did I get if I bought $\frac{1}{2}$ of a gallon of vinegar from one dealer and $\frac{1}{4}$ of a gallon from another?

7. In 4 lb. 4 oz. and 6 lb. 2 oz., how many pounds and ounces are there?

8. How many quarts are there in $12\frac{1}{2}\%$ of $\frac{1}{2}$ bu. of beans?

9. If I buy a knife for 75¢ and sell it at a gain of 100%, for how much do I sell it?

10. James skated 80 yd., Henry skated a distance which is 175% more than the distance James skated. How far did Henry skate?

Written.

	£	s.	d.		gal.	qt.	pt.
1. Add:	5	9	5	2. Add:	1	3	1
	10	9	5			2	1
	24	10	9		5	1	1
					<u>2</u>	<u>3</u>	<u>1</u>

3. Find the sum of 3 T. 19 cwt. 26 lb., 9 T. 15 cwt. 52 lb., and 14 T. 12 cwt. 65 lb.

4. Find the sum of 5 A. 36 sq. rd. 3 sq. yd., 19 A. 25 sq. rd. 18 sq. yd., and 45 A. 12 sq. rd. 15 sq. yd.

5. Reduce $\frac{3}{4}$ bu. to lower denominations.

	lb.	oz.	pwt.		gal.	qt.	pt.
6. Add:	13	7	3	7. Add:	6	3	1
		9	5			4	2
	2	8	8			7	1

8. Find the sum of 4 cwt. 46 lb. 12 oz., 12 cwt. 9 lb. 8 oz., and 2 cwt. 25 lb.

9. Find the sum of 14 bu. 2 pk. 5 qt., 21 bu. 3 pk. 6 qt., and 8 bu. 1 pk. 7 qt.

10. Reduce 12 T. 16 cwt. 38 lb. to tons and the decimal part of a ton.

XIV

Oral.

Rapidly find :

$\frac{3}{4}$ of 24; of 48; of 72; of 15; of 27; of 57; of 36.

$.12\frac{1}{2}$ of 16; of 32; of 24; of 72; of 56; of 64; of 48.

$33\frac{1}{3}\%$ of 15; of 36; of 24; of 27; of 108; of 72; of 48.

	qt.	pt.	pt.	gi.	pwt.	gr.	£	s.
1. Add:	2	1	6	3	16	8	4	8
	5	1	8	1	5	7	3	2

2. A push-cart peddler bought a bushel of chestnuts for \$2.40 and sold them at 5¢ a pint. How much did he gain?

3. How much will be gained on milk per quart when it is bought at 16¢ a gallon and sold at 4¢ a pint?

4. How much will 8 oz. 5 pwt. of old gold be worth at \$1 an ounce?

5. If $3\frac{1}{2}$ yd. of cloth cost \$14, how much will $\frac{1}{4}$ of a yard cost?

Rapidly find :

$\frac{1}{4}$ of 32; of 16; of 24; of 36; of 72; of 48; of 56.

.08 $\frac{1}{2}$ of 72; of 36; of 144; of 24; of 96; of 48; of 84.

25 % of $\frac{1}{2}$; of $\frac{1}{4}$; of $1\frac{1}{2}$; of $1\frac{3}{8}$; of $3\frac{1}{2}$; of $1\frac{3}{8}$; of $1\frac{1}{2}$.

6. A farmer bought .75 bu. of grass seed at \$5 a bushel. How much did it cost him?

7. A lumberman paid \$3 $\frac{1}{5}$ for shoeing 2 yoke of oxen. How much did it cost him to shoe each ox?

8. If a box of pencils costs 9¢, how many boxes at that rate can you buy for a class of pupils who have \$2.34 to spend?

9. A man having $\frac{1}{2}$ of a barrel of flour gave $\frac{1}{4}$ of it away. What part of a barrel had he left? How many pounds had he left?

10. A man having 200 marbles sells 25 % of them. How many has he left?

Written

1. What is the sum of $\frac{3}{4}$ wk. $\frac{3}{8}$ da. and $\frac{3}{8}$ hr.? *

2. Find the sum of $\frac{5}{8}$ da. and $\frac{7}{15}$ hr.

3. Find the sum of 22 $\frac{3}{10}$ cwt., 26 $\frac{1}{2}$ lb., and 14 oz.

	da.	hr.	min.	sec.
* SUGGESTION: $\frac{3}{4}$ wk. = ?	?	?	?	?
$\frac{3}{8}$ da. =	?	?	?	
$\frac{3}{8}$ hr. =			?	?

4. Find the sum of 36 gal. 3 qt. $1\frac{1}{2}$ pt., $\frac{7}{8}$ gal. 2 qt. $\frac{3}{4}$ pt., and 1.75 pt.

5. At the rate of 25 lb. of cheese for $\$3\frac{1}{2}$, how much will 2 cwt. cost?

6. Add 7 yd. 2 ft., 5 yd. $1\frac{1}{2}$ ft., 2 ft. $9\frac{1}{2}$ in., 3 yd. 1 ft. $6\frac{1}{2}$ in., $2\frac{3}{4}$ ft., and $4\frac{1}{2}$ yd.

7. A farmer bought 3 loads of hay at \$15 a ton. The first weighed 1.125 T., the second $1\frac{3}{4}$ T., and the third 2750 lb. How much did the three loads cost him?

8. Find the sum of 32 bu. 2 pk. 6 qt., 24 bu. 1 pk. 4 qt., 16 bu. 3 pk. 7 qt.

9. Change .62 of a rod to yards and feet.

10. $2\frac{1}{2}$ is what decimal part of $3\frac{1}{2}$?

XV

Oral.

Rapidly find the per cent that :

8 is of 16	$\frac{1}{2}$ is of $\frac{1}{4}$	1 pt. is of 1 pk.
4 is of 12	$\frac{1}{4}$ is of $\frac{1}{2}$	1 qt. is of 1 gal.
3 is of 24	$\frac{1}{2}$ is of $\frac{1}{8}$	1 pk. is of 1 bu.
5 is of 25	$\frac{1}{4}$ is of $\frac{1}{18}$	1 in. is of 1 ft.

1. James picked 6 qt. 1 pt. of cherries and Henry picked 8 qt. 2 pt. How many pints did they both pick?

2. $\frac{1}{2}$ gal. + $\frac{1}{2}$ qt. + $\frac{1}{2}$ pt. = ?

3. How much will 2 gal. 2 qt. of milk cost at 5¢ a pint?

4. Change .06 of a bushel to the decimal of a peck.

5. How much will 9 peaches cost at the rate 3 peaches for 5¢?

Rapidly find the per cent that

- | | | | |
|-------------|-------------|------------------------------------|--------------------|
| 12 is of 72 | 7 is of 28 | $1\frac{1}{2}$ is of $\frac{3}{4}$ | 1 ft. is of 1 yd. |
| 12 is of 84 | 6 is of 42 | $2\frac{1}{4}$ is of $\frac{3}{4}$ | 1 in. is of 1 ft. |
| 9 is of 54 | 14 is of 56 | $\frac{2}{3}$ is of $1\frac{1}{2}$ | 6 in. is of 1 yd. |
| 8 is of 56 | 25 is of 75 | $\frac{3}{8}$ is of $\frac{3}{4}$ | 27 in. is of 1 yd. |

6. Add $\frac{1}{4}$ bu., $\frac{1}{4}$ pk., $\frac{1}{4}$ qt.
7. Find the sum of 3 oz. 4 pwt. and 5 oz. 6 pwt.
8. Reduce $\frac{5}{8}$ yd. to inches.
9. At 12¢ a pint how many gallons of sirup may I buy for \$3.84?
10. If $2\frac{1}{2}$ bbl. of apples cost \$15, how many barrels can be bought for \$12?

Written.

1. Add £8 14s. 9d. 3f., £10 16s. 8d. 2f., £25 12s. 7d. 1f.
 2. Add $\frac{3}{8}$ bu., $\frac{1}{2}$ pk., $\frac{3}{4}$ qt.
 3. 1 bu. 4 qt. is what part of 2 bu.?
 4. Reduce 7 yd. 2 ft. 8 in. to the decimal of a rod.
 5. If $\frac{3}{8}$ of an estate is worth \$3460, how much is $\frac{1}{4}$ of it worth?
-
6. Add 7 cwt. 84 lb. 14 oz., 5 cwt. 97 lb. 8 oz., 2 cwt. 9 lb. 15 oz.
 7. Add $\frac{3}{4}$ gal., $\frac{1}{2}$ qt., $\frac{1}{2}$ pt.
 8. What part of 2 bu. is $\frac{1}{2}$ pt.?
 9. What decimal part of a peck is 6 qt. 1 pt.?
 10. Reduce 4 A. 57 sq. rd. 16 sq. yd. to square yards.

XVI

Oral.

Rapidly give the products :

35	60	38	16	27	16	15
<u>$1\frac{1}{2}$</u>	<u>1.5</u>	<u>$2\frac{1}{2}$</u>	<u>.5</u>	<u>$1\frac{2}{3}$</u>	<u>$1\frac{1}{4}$</u>	<u>.5</u>
12	24	30	40	17	25	60
<u>2.5</u>	<u>$1\frac{1}{2}$</u>	<u>1.2</u>	<u>2.5</u>	<u>$\frac{1}{2}$</u>	<u>$2\frac{1}{6}$</u>	<u>1.4</u>

How many days are there from Jan. 25th to the end of the month ? from May 15th to May 31st ? from April 15th to April 30th ? from April 15th to May 6th ?

Since January is the first month of the year, what month is March ? June ? September ? February ? November ?

1. How many years and months were there from April 1, 1908 to Jan. 1, 1910 ?

2. How many days are there from Christmas Day to Washington's Birthday ?

3. A boy bought $\frac{1}{2}$ pk. of chestnuts and ate $\frac{1}{2}$ a quart of them. How many quarts and pints were left ?

4. To make jelly I bought at one time $\frac{1}{4}$ of a bushel of currants and at another, $\frac{1}{2}$ of a peck. How many pecks had I then ?

5. The dividend is $4\frac{1}{2}$ and the divisor .005. What is the quotient ?

Rapidly give the products :

18	24	16	12	36	28	39
<u>.5</u>	<u>.2</u>	<u>1.2</u>	<u>1.5</u>	<u>$1\frac{1}{2}$</u>	<u>$1\frac{1}{4}$</u>	<u>$1\frac{1}{3}$</u>

40	60	15	14	25	30	42
<u>2.5</u>	<u>1.5</u>	<u>.8</u>	<u>1.2</u>	<u>1.5</u>	<u>1.2</u>	<u>1.2</u>

6. How many days are there from May 30th to July 4th?

7. From $\frac{3}{4}$ bu. take .5 bu. Give the answer in pecks.

8. What part of a bushel is 3 pk. 7 qt.?

9. How many rods are there in 2 mi. and 40 rd. of fencing?

10. What decimal part of 6 feet square is 6 sq. ft.?

Written.

	gal.	qt.	pt.		yr.	mo.	da.
1. From	29	1	1	2. From	1910	6	8
take	<u>20</u>	<u>3</u>	<u>1</u>	take	<u>1905</u>	<u>7</u>	<u>9</u>

3. From 16 lb. 8 oz. 6 pwt. take 7 lb. 4 oz. 12 pwt.

4. From 19 T. 17 cwt. 58 lb. take 16 T. 19 cwt. 75 lb.

5. Reduce $\frac{5}{12}$ of a mile to lower denominations.

	mi.	fur.	rd.		yr.	mo.	da.
6. From	5	3	11	7. From	1909	7	8
take	<u>2</u>	<u>1</u>	<u>4</u>	take	<u>1905</u>	<u>2</u>	<u>15</u>

8. From a tub of butter containing 1 cwt. 38 lb., 56 lb. 8 oz. were taken. How much remained?

9. From 13 bu. 3 pk. 6 qt. take 7 bu. 3 pk. 7 qt.

10. Reduce 19658 lb. to higher denominations.

XVII

Oral.

Rapidly give the quotients:

$$\begin{array}{ccccc}
 .5 \overline{)25} & .2 \overline{)6.8} & .05 \overline{)1.25} & .02 \overline{)1.44} & .4 \overline{).24} \\
 .04 \overline{).24} & 40 \overline{).24} & 40 \overline{)2.4} & .3 \overline{)36} & .3 \overline{)3.6} \\
 30 \overline{)3.6} & 30 \overline{).36} & 6 \overline{)7.2} & 60 \overline{)7.2} & .6 \overline{)7.2}
 \end{array}$$

1. How many months are there from Jan. 1, 1898 to Jan. 1, 1910 ?

2. How many months are there from Jan. 1, 1900 to May 1, 1910 ?

3. A clerk who received \$600 a year had his salary raised 25 %. How much is his salary now ?

4. If to 8 gal. of alcohol 2 gal. of water are added, what per cent of the mixture is alcohol ?

5. A boy bought a gun for \$4. For how much must he sell it to gain 5 % ? _____

Rapidly give the quotients :

$$\begin{array}{ccccc}
 9 \overline{)1.8} & 90 \overline{)1.8} & 900 \overline{)1.8} & .9 \overline{)1.8} & .09 \overline{)1.8} \\
 8 \overline{)2.4} & 8 \overline{).24} & 8 \overline{).024} & .8 \overline{).24} & .08 \overline{).024} \\
 .5 \overline{)2.5} & .05 \overline{)2.5} & 50 \overline{)2.5} & 50 \overline{).25} & 500 \overline{).25}
 \end{array}$$

6. If to 48 gal. of milk 2 gal. of water are added, what per cent of the mixture is water ?

7. Cloth that was bought for \$2 a yard was sold at an advance of 25 %. For how much did 10 yd. sell ?

8. A farmer, having 25 bbl. of apples, sold 60 % of them at \$2 a barrel. How much did he receive for his apples?

9. A farmer, having $5\frac{3}{8}$ T. of hay, sold all but $3\frac{1}{4}$ T. How much did he sell?

10. How much corn at $\$ \frac{2}{5}$ a dozen ears can be bought for \$1.20?

Written.

1. What was the difference in time between Jan. 16, 1876 and April 4, 1880?

2. The construction of the Brooklyn Suspension Bridge was commenced Jan. 3, 1870 and the bridge was opened for travel May 24, 1883. How long was it in building?

3. How many years, months, etc., elapsed from 3 o'clock P.M. of May 16, 1864 to 9 o'clock A.M. of Sept. 25, 1875?

4. The war between England and America was commenced April 19, 1775 and peace was restored Jan. 20, 1783. How long did the war last?

5. From $1\frac{1}{2}$ bu. subtract .8 of a bushel.

6. How many years, months, and days were there from Washington's Birthday to Independence Day, 1910?

7. What time elapsed from April 10, 9 o'clock A.M., 1873 to 2 o'clock P.M., July 15, 1883?

8. What was the difference in time between Jan. 16, 1873 and July 10, 1875?

9. Six and four fifths pounds sterling was divided equally among 17 boys. How many shillings did each get?

10. A man shipped 2600 bu. of grain from Chicago, and 455 bu. were thrown overboard during a gale. What was the rate per cent of his loss?

XVIII

Oral.

Rapidly give the results:

94 + 78	88 - 75	75 × 4	175 ÷ 5
86 + 75	58 - 43	82 × 6	136 ÷ 4
73 + 68	63 - 18	56 × 7	156 ÷ 6
92 + 74	94 - 87	81 × 8	248 ÷ 8

1. If 6 boys in a club contribute \$2.10, how much should 27 boys contribute?

2. If 5 bu. of oats are worth \$3 $\frac{1}{4}$, how much are 10 bu. worth?

3. If 2 $\frac{1}{2}$ yd. of broadcloth cost \$10, what is the price of $\frac{1}{2}$ a yard? (Analyze the solution.)

4. What common fractional part of anything is 75 % of it? Find 75 % of 120 A.

5. In a lot of 1000 bbl. of apples 12 $\frac{1}{2}$ % were worthless. How many barrels were good?

Rapidly give the results:

40 + 18	54 - 27	27 × 2	840 ÷ 7
37 + 23	48 - 26	32 × 4	720 ÷ 9
56 + 28	62 - 39	29 × 3	560 ÷ 7
46 + 24	74 - 36	45 × 5	420 ÷ 6

6. If 8 men can do a piece of work in 20 days, how long at the same rate will it take 4 men?

7. A bag of flour weighs $24\frac{1}{2}$ lb. How many $3\frac{1}{2}$ lb. packages will equal a bag?

8. A man had 60 sheep; he lost $16\frac{2}{3}\%$ of them. How many had he left?

9. Mary had 12¢ and gave 3¢ to Henry. What per cent of her money did she keep?

10. From a cask containing 96 gal. of oil 32 gal. were drawn. What per cent of the whole remained in the cask?

Written.

What is the difference in days from May 16th to Dec. 24th?*

1. How many days are there from June 20th to Jan. 10th?

2. How many days did a note run that was dated May 20, 1911, and paid Sept. 14, 1911?

3. The Spanish American war commenced April 12, 1898 and ended Aug. 12, 1898. How many days did it last?

4. How many days were there from Jan. 1, 1910 to May 15, 1910?

* SUGGESTION:	May	15	days
	June	?	days
	July	?	days
	Aug.	?	days
	Sept.	?	days
	Oct.	?	days
	Nov.	?	days
	Dec.	24	days
		<u>?</u>	days

5. Mr. John Johnson, Middletown, N. Y., sold on May 18, 1910, to Hart & Co. of New York City the following: 726 lb. butter at 24¢; 972 lb. cheese at 9¢; 481½ lb. lard at 12¢; 509¾ lb. tallow at 16¢; 81 doz. eggs at 30¢; 15 bbl. salt at \$2.40; 963 lb. ham at 14¢. Make out a bill for the amount and receipt it.

6. How many days are there from May 8th to Oct. 19th?

7. Find the difference in time from March 28th to Dec. 16th.

8. How many days are there from Feb. 21, 1860 to Sept. 10, 1860?

9. What decimal part of $\frac{1}{2}$ is $\frac{8}{21}$?

10. Reduce .976 A. to lower denominations.

XIX

Oral.

Rapidly add:

ft.	in.	rd.	ft.	yd.	ft.	bu.	pk.	pk.	qt.	qt.	pt.
24	2	25	4	27	2	45	4	16	1	28	1
13	8	10	11	25	1	20	6	14	3	16	1

$$56 + ? = 72 \quad ? + 24 = 56 \quad 17 \times 5 = ? \quad ? \times 4 = 64 \quad 28 \times ? = 168$$

1. If .75 of a bushel of oats will last my pony one week, how long will 2 bu. 1 pk. last him?

2. A peddler bought hats at \$18 per dozen and sold them at an advance of $16\frac{2}{3}\%$. At what rate did he sell them?

3. A farmer sold a cow that cost \$25 at a profit of \$15. What was the per cent of gain on the cow?

4. What part of 15 is $\frac{2}{3}$?

5. What part of $\frac{7}{8}$ is $\frac{5}{8}$?

Rapidly add :

gal.	qt.	qt.	pt.	pt.	gl.	da.	hr.	hr.	min.	min.	sec.
35	4	17	1	29	2	47	8	38	16	48	14
15	2	14	1	15	1	21	9	25	15	26	12

$$27 - ? = 15 \quad ? - 25 = 60 \quad 64 + 4 = ? \quad 96 + ? = 24 \quad ? + 7 = 21$$

6. Reduce .001200 to lowest decimal terms.

7. How many thousandths are there in $\frac{1}{10}$?

8. At the rate of $2\frac{1}{2}$ yd. of ribbon for \$ $\frac{5}{8}$, how many yards can be bought for \$6?

9. From $.04\frac{1}{2}$ take .004.

10. How much will 10 lb. of sugar cost at $\frac{1}{2}$ of a dime a pound?

Written.

1. What is the difference in time between Dec. 5, 1825 and Jan. 20, 1875?

2. How many days are there from June 15th to Nov. 23d?

3. What part of a bushel is $\frac{3}{8}$ of a quart?

4. What decimal part of $17\frac{1}{2}$ bu. is $2\frac{1}{2}$ bu.?

5. If $\frac{2}{3}$ of a ton of coal costs \$6 $\frac{2}{3}$, how much will $\frac{5}{8}$ of a ton cost?

6. Reduce 5 A. 65 sq. rd. 15 sq. yd. to acres.
7. From $\frac{5}{8}$ yd. take $1\frac{1}{2}$ ft.
8. Add £.125, .65s., .75d.
9. $(5000 + .002) + .02 = ?$
10. Reduce .8 of a bushel to lower denominations.

XX

Oral.

Rapidly subtract:

rd.	yd.	yd.	ft.	ft	in.	bu.	pk.	pk.	qt.	qt.	pt.
65	4	27	2	15	5	54	3	72	2	15	1
28	1	16	1	8	7	48	2	48	3	11	2

1. What per cent of 2 rd. is 1 yd.?
2. How much will a 40 qt. can of milk cost at 24¢ a gallon?
3. How many days were there from Washington's Birthday to Decoration Day in 1912?
4. A merchant marks an article \$28, but takes off 14 $\frac{1}{2}$ % for cash. What is the selling price?
5. From an acre of land I sold 16 sq. rd. and also 8 rods square. What per cent of my land have I left?

Rapidly subtract:

gal.	qt.	qt.	pt.	pt.	gi.	oz.	pwt.	pwt.	gr.	oz.	dr.
24	3	29	0	60	2	14	14	52	9	29	6
15	1	14	1	45	3	10	16	27	15	18	7

6. How many baskets, holding 2 $\frac{1}{2}$ pk. each, will 5 bu. of apples fill?
7. How many days are there from Sept. 9th to Nov. 3d?

8. How many pints are there in 2 gal. 3 qt.?
9. A man having \$40 divided 20 % of it equally among each of his 4 sons. How much did each get? How much had the father left?
10. A hardware merchant sold a stove that cost \$18 at \$6 above cost. What per cent did he make?

Written.

1. Theodore Roosevelt was born Oct. 27, 1858 and became President Sept. 14, 1901. How old was he then?
2. May 2, 1912 Rand & Co., 314 Broadway, New York City, sold Mrs. J. Burt, 9 E. 10th St., New York City : 6 yd. silk @ \$1.25; $12\frac{1}{2}$ yd. linen @ 28¢; 16 yd. lawn @ $12\frac{1}{2}$ ¢; 3 doz. buttons @ 56¢; and 8 collars @ $12\frac{1}{2}$ ¢. Make out a bill for the amount and receipt it.
3. From $\frac{3}{4}$ of a bushel take $\frac{3}{4}$ of a peck.
4. How many days are there from March 4th to Sept. 1st?
5. If $\frac{2}{3}$ of a farm is worth \$8000, how much is $\frac{5}{8}$ of it worth?

6. Abraham Lincoln was born Feb. 12, 1809 and became President March 4, 1861. How old was he then?
7. Mr. Taylor owns 3 farms. The first contains 358 A. 60 sq. rd., the second 232 A. 85 sq. rd., the third 279 A. 15 sq. rd. How many acres in all does Mr. Taylor own?
8. A farmer sold out of 5 bu. of pears the following quantities: 3 pk. 6 qt., 4 pk. 3 qt., 1 bu. 1 pk. 1 qt. How much had he still to sell?
9. Reduce $\frac{1}{8}$ of a gallon to quarts and pints.
10. What decimal part of a day is 15 hr. 45 min.?

SECOND MONTH

RAPID DRILLS—daily.

THE FUNDAMENTAL OPERATIONS—to secure quickness and accuracy.

COMMON FRACTIONS—reviewed.

DECIMAL FRACTIONS—reviewed.

DENOMINATE NUMBERS—Reduction, addition, subtraction (distance between places), multiplication, division.

MEASUREMENTS—Areas of triangles, rectangles, parallelograms. Cost of carpeting.

TABLES—reviewed.

PERCENTAGE. Finding per cents of numbers. Finding what per cent one number is of another. Finding a number when a per cent of it is given.

PROBLEMS. To cover the work of a month in common and decimal fractions, and tables ; also three of the type problems.

XXI

Oral.

Rapidly reduce to eighths :

$\frac{1}{2}$; $\frac{3}{4}$; $1\frac{1}{2}$; $1\frac{1}{4}$; $\frac{21}{44}$; $\frac{14}{18}$; $\frac{24}{48}$.

Reduce to improper fractions :

$5\frac{1}{4}$; $6\frac{2}{3}$; $7\frac{1}{2}$; $8\frac{3}{4}$; $9\frac{1}{8}$; $4\frac{2}{3}$; $6\frac{5}{8}$.

Reduce to mixed numbers :

$\frac{27}{8}$; $\frac{18}{5}$; $\frac{25}{2}$; $\frac{17}{8}$; $\frac{20}{3}$; $\frac{18}{5}$; $\frac{27}{4}$.

What is an improper fraction? What is a mixed number? How is a fraction reduced to lower terms? How is a fraction reduced to higher terms?

1. What is the sum of $\frac{2}{3}$ of a day and $\frac{1}{3}$ of a day?
2. What part of a dollar is 27¢ and 35¢? Tell how to add fractions.
3. A man did $\frac{1}{4}$ of a piece of work in one day, $\frac{1}{8}$ of it the next day, and $\frac{3}{8}$ of it the following day. What part of the work was completed in the three days?
4. Add $2\frac{3}{8}$ hr. and $2\frac{1}{4}$ hr.
5. What is $\frac{5}{8}$ of \$56? $62\frac{1}{2}\%$ of 48¢?

Rapidly reduce to the same denominator :

$$\frac{1}{2}; \frac{1}{4}; \frac{1}{8}; \frac{1}{3}; \frac{2}{3}; \frac{3}{8}; \frac{5}{8}.$$

Reduce to lowest terms :

$$\frac{28}{36}; \frac{16}{36}; \frac{8}{36}; \frac{20}{36}; \frac{24}{36}; \frac{32}{36}; \frac{40}{36}.$$

Reduce to ten-thousandths:

$$.06; .6; .006; 6.0; 60.; .0006.$$

Reduce to lowest decimal terms:

$$\frac{60}{100}; \frac{600}{1000}; \frac{600}{10}; \frac{60}{10}; \frac{6000}{1000}; \frac{60}{1000}.$$

How is a mixed number reduced to an improper fraction? How is an improper fraction reduced to a whole or a mixed number?

6. James picked $8\frac{1}{4}$ bu. of berries and Henry $7\frac{1}{2}$ bu. How many bushels and pecks did they both pick?
7. At the rate of $1\frac{1}{2}$ pk. of peanuts for 48¢, how much will 1 qt. cost?
8. If it takes 5 men 15 da. to do a piece of work, how long at the same rate will it take 10 men to do it?

9. From a chest of tea containing 54 lb. there were sold 27 lb. 7 oz. How many pounds remained?

10. How many square inches are there in the surface of a sheet of paper measuring 11 in. by 13 in.?

Written.

	hr.	min.	sec.		bu.	pk.	qt.
1. Multiply	5	42	50	2. Multiply	2	2	6
by	<u>12</u>			by	<u>47</u>		

3. How much will 6 loads weigh, each containing 9 T. 14 cwt. 56 lb.?

4. How much will 19 yd. cost at £ 5 15s. 8d. 3f. a yard?

5. Reduce .22 of a hogshead to lower denominations.

6. Multiply 5 lb. 9 oz. 16 pwt. 21 gr. by 8.

7. How much will 84 yd. cost at £ 1 8s. 9d. a yard?

8. Find the weight of 10 silver spoons each weighing 3 oz. 7 pwt. 13 gr.

9. Multiply 10 rd. 1 yd. 1 ft. by 7.

10. From 14 lb. 5 oz. 3 pwt. 16 gr. take 7 lb. 6 pwt. 7 gr.

XXII

Oral.

Rapidly multiply:

bu.	pk.	bu.	qt.	pk.	qt.	gal.	qt.
4	2	5	4	7	4	6	2
	<u>3</u>		<u>2</u>		<u>4</u>		<u>5</u>

Rapidly multiply :

gal.	pt.	yd.	ft.	yd.	in.	ft.	in.
8	1	5	2	8	6	9	4
<hr/>		<hr/>		<hr/>		<hr/>	
	7		4		3		6

Add .2 and .04; .06 and .5; .052 and .7; .006 and .05.

1. If a boy earns 10¢ an hour, how much will he earn in $\frac{5}{8}$ of 18 hours?

2. How much will $10\frac{3}{4}$ cords of wood cost at \$8 per cord?

3. How much will $5\frac{1}{4}$ pounds of coffee cost at $37\frac{1}{2}$ ¢ a pound?

4. One third of 12 is $\frac{4}{7}$ of what number?

5. I bought 6 tons of coal at \$6.50 a ton, and gave the dealer 2 twenty-dollar bills. How much change should I receive?

Rapidly multiply:

qt.	pt.	pt.	qt.	bu.	pk.	gal.	qt.
5	1	8	3	15	2	6	3
<hr/>		<hr/>		<hr/>		<hr/>	
	9		4		8		6

pk.	qt.	qt.	pt.	yd.	ft.	yd.	in.
7	5	9	1	12	2	14	8
<hr/>		<hr/>		<hr/>		<hr/>	
	2		3		4		2

6. A boy lost $\frac{5}{8}$ of his kite string and then $\frac{3}{8}$ of what was left. What part of the original string has he now?

7. When hay is \$10 a ton, how much will 1000 lb. cost?

8. At the rate of 3 oranges for 5¢, how much will $1\frac{1}{2}$ doz. cost?

9. A bushel of nuts was sold for 5¢ per quart. How much money did it bring?

10. One half of 22 is how many times 4?

Written.

1. Divide $6\overline{)56\ 9\ 12}$ 2. Divide $53\overline{)311\ 1\ 1.}$

3. If 8 books cost £ 35 9s. 6d., how much will 1 book cost?

4. Divide 282 bu. 3 pk. 1 qt. 1 pt. of potatoes equally among 12 persons.

5. A farmer gathered 150 bu. 3 pk. of apples from 24 trees. What was the average yield per tree?

6. Divide 54 gal. 3 qt. 1 pt. 3 gi. by 8.

7. In 41 loads of hay there were 19 T. 6 cwt. 22 lb. What was the average weight of the loads?

8. A miller stored 450 bu. 3 pk. of grain in 18 bins. What was the average contents of the bins?

9. How many iron rails, each 18 ft. long, will be required to lay 3 mi. of railroad track?

10. Reduce 5 oz. 4 dr. 2 sc. 20 gr. to the decimal of a pound.

XXIII

Oral.

Rapidly divide:

$4\overline{)24\ 4}$	$8\overline{)33\ 0}$	$6\overline{)25\ 1}$	$3\overline{)16\ 4}$
$4\overline{)56\ 2}$	$8\overline{)36\ 6}$	$3\overline{)17\ 2}$	$7\overline{)24\ 1}$

1. I bought a notebook for 18¢ and sold it for 12¢. What part of my money was lost? How many hundredths?

2. How much shall I have to pay for 72 lb. of wool at $37\frac{1}{2}$ ¢ a pound?

3. If butter is sold at the rate of $37\frac{1}{2}$ ¢ per pound, how many pounds can I buy for \$30?

4. How much shall I have to pay for $\frac{1}{2}$ a gross of pencils at 15¢ a dozen?

5. What is the product of .5 and .08?

Rapidly divide: _____ .

yd.	ft.	yd.	in.	ft.	in.	oz.	pwt.
3)14	0	6)20	6	8)34	8	7)12	5

pwt.	gr.	oz.	dr.	oz.	sc.	dr.	sc.
4)21	4	5)17	4	6)13	0	4)18	2

6. How much will $\frac{7}{8}$ of a yard of ribbon cost at $\$ \frac{3}{8}$ a yard?

7. I paid 36¢ for a bicycle wrench and afterwards sold it for 24¢. What part of my money did I lose? How many hundredths did I lose?

8. How many pounds of coffee can I buy for \$24 at the rate of 1 lb. for $37\frac{1}{2}$ ¢?

9. Multiply .09 by .006.

10. If 1 gross of post cards sells for \$2.88, for how much will 5 sell?

Written.

1. How many boxes, each containing 4 bu. 3 pk. 2 qt., can be filled from 336 bu. 3 pk. 4 qt. of apples? *

2. How many baskets, each containing 1 bu. 1 pk. 7 qt., can be filled from 356 bu. 3 pk. 5 qt. of peaches?

3. If a man feeds his horse 1 pk. 6 qt. of oats a day, how long will 3 bu. 2 qt. last?

4. While traveling in England, I paid £2 8s. 9d. for 13 yd. of silk. How much would 8 yd. cost at that rate? (Do not reduce before dividing or multiplying.)

5. In a lodge of 48 Englishmen each man's assessment was £4 6s. 4d. How much was collected at the meeting if $\frac{7}{8}$ of the members were present?

6. How many demijohns, each containing 2 gal. 3 qt. 1 pt., can be filled from a barrel holding 71 gal. 3 qt. 1 pt. of wine?

7. If 8 bbl. of wine cost £24 12s. 8d., find the cost of 12 bbl.

8. A dealer bought 25 loads of merchandise, each load containing 19 T. 16 cwt. 38 lb. He sold $\frac{1}{8}$ of all. How much had he left?

9. A grocer bought 8 cwt. 14 lb. 6 oz. of sugar one day and 6 times as much the next day. How much did he buy in all?

10. A farmer exchanged 40 cd. of wood, worth \$5.25 a cord, for 30 bbl. of flour. How much was the flour worth a barrel?

* SUGGESTION: First reduce both dividend and divisor to lowest denominations.

XXIV

Oral.

Rapidly add :

480	640	790	530	670	520	575	483	378	324	586
<u>270</u>	<u>320</u>	<u>360</u>	<u>350</u>	<u>460</u>	<u>380</u>	<u>322</u>	<u>245</u>	<u>262</u>	<u>217</u>	<u>328</u>

1. Seventy-two is $\frac{3}{8}$ of what number?
2. I sold a bicycle for \$36, which was $\frac{4}{5}$ of what it cost me. How much did it cost me?
3. Sixteen is .4 of what number?
4. I sold a horse for \$81, which was .9 of what I paid for it. How much did it cost me?
5. How many hours and minutes are there in $\frac{1}{2}$ of a day?

Rapidly add :

418	415	419	524	525	527	538	428	429	325	329
<u>263</u>	<u>264</u>	<u>320</u>	<u>218</u>	<u>219</u>	<u>232</u>	<u>235</u>	<u>216</u>	<u>223</u>	<u>226</u>	<u>236</u>

6. Eight ninths is $\frac{4}{5}$ of what number?
7. What is the product of .04 and .8?
8. What fractional part of the cost is gained by buying for 24¢ and selling for 28¢? What decimal part is gained?
9. If 40 pounds is .4 of my weight, how much do I weigh?
10. I divided .5 of a pound of cherries among 4 children. What part of a pound did each receive?

Written.

1. A dealer bought 4 T. 16 cwt. 22 lb., 5 T. 10 cwt. 18 lb., and 7 T. 9 cwt. 35 lb. of cheese. He sold 8 T. 17 cwt. 15 lb. Find the value of the remainder at 20¢ a pound.

2. Mr Adkins bought 9 loads of hay, each containing 16 T. 13 cwt. 45 lb. He sold $\frac{1}{2}$ of all. How much had he left?

3. What part of 5 bu. is 3 bu. 1 pk. 2 qt.?

4. How much will $5\frac{1}{2}$ lb. of tea cost if $1\frac{1}{4}$ lb. cost \$1.50?

5. At the rate of $3\frac{1}{2}$ cd. of wood for \$7 $\frac{1}{2}$, how many cords of wood will \$31 $\frac{1}{2}$ buy?

6. A man had £75 18s. He spent $\frac{1}{8}$ of it. How much had he left?

7. A jeweler bought 8 packages, each containing 5 lb. 9 oz. 16 pwt. 21 gr. of gold dust. He sold 19 lb. 8 oz. 22 gr. How much had he left?

8. If the daily session of a school is 5 hr. 45 min., how many school hours are there in a term of 15 weeks of 5 days each?

9. If 36.75 yd. of velvet cost \$110.25, how much will 14 $\frac{1}{4}$ yd. cost?

10. A dealer bought 240000 ft. of lumber at \$15.90 per M and sold it at \$2 $\frac{1}{4}$ per C. How much did he gain?

Oral.**XXV**

Rapidly add:

.024	4.52	48.4	4.73	.563	4.002	2.708	1.426
<u>.18</u>	<u>2.34</u>	<u>15.0</u>	<u>2.74</u>	<u>.328</u>	<u>.648</u>	<u>1.589</u>	<u>1.34</u>

1. Reduce $\frac{1}{2}$ of a bushel to lower denominations.
2. Reduce .2 of a gallon to lower denominations.
3. What part of a day is 15 hr.?
4. What per cent of a gallon is 3 pt.?
5. Alexander picked $\frac{1}{2}$ of a bushel of currants in the morning and $\frac{1}{4}$ of a peck in the afternoon. How much did he pick during the day?

Rapidly add :

.72	6.72	3.05	5.005	70.008	.5	.182	.8	3.2
<u>.48</u>	<u>4.48</u>	<u>1.02</u>	<u>1.28</u>	<u>10.045</u>	<u>.006</u>	<u>.17</u>	<u>.056</u>	<u>.158</u>

6. How many hours are there in $\frac{5}{8}$ of a day?
7. Reduce 4 oz. 6 pwt. to pennyweights.
8. What decimal part of a yard is 9 in.?
9. In .7 of a minute how many seconds are there?
10. Three fourths of a peck is what part of a bushel?

Written.

1. Add 18 lb. 9 oz. 18 pwt. 12 gr., 13 lb. 7 oz. 15 pwt. 21 gr., 19 lb. 11 oz. 16 pwt. 15 gr.
2. Benjamin Franklin was born Jan. 6, 1706 and died April 17, 1790. At what age did he die?
3. How much will 12 firkins of butter weigh if each firkin weighs 63 lb. $13\frac{3}{4}$ oz.?
4. If 9 farmers raise 1137 bu. 3 pk. 4 qt. 1 pt. of grain, how much is the average yield?
5. How many opal rings, at £6 11d. each, can be bought for £48 7s. 4d.?

6. Add 13 T. 15 cwt. 54 lb. 15 oz., 24 T. 12 cwt. 35 lb. 13 oz., 68 T. 17 cwt. 84 lb. 9 oz.

7. Washington was born Feb. 22, 1732 and died Dec. 14, 1799. At what age did he die?

8. How long had a note to run that was dated Jan. 16, 1883 and was payable July 10, 1883?

9. Multiply 18 cwt. 74 lb. 9 oz. by 6.

10. Divide £103 7s. 6d. into 5 equal parts.

XXVI

Oral.

Rapidly divide each of the following numbers first by 10, then by 20, then by 40:

160; 1.60; 6.4; 6.40; .360; 3.20; 480; 48; 4.8; .72.

How many pecks are there in a bushel? how many quarts? how many pints? In 2 bu. how many quarts are there? In 3 gal. how many quarts are there? At 5¢ a quart, how much will a gallon cost? At \$1 a bushel, how much will a bushel and a peck cost?

1. How much will 2 oz. of gold cost, if 3 pwt. cost \$2.70?

2. How many rods are there in 66 ft.?

3. How much will 1 bu. 3 pk. of apples cost at \$1.20 a bushel?

4. How many cups holding $\frac{1}{2}$ pt. each can be filled from a coffee urn holding 2 gal. 3 qt. 1 pt.?

5. For how much will 2 gal. of ice cream sell at 15¢ a pint?

Rapidly divide each of the following numbers first by 10, then by 30, then by 60:

120; 1.20; .24; 2.4; 300; 720; 7.20; .48; 3.60; .42.

6. How much will 15 lb. of flour cost at the rate of \$4 a hundredweight?

7. I paid \$3.20 for a bushel of huckleberries. For how much per quart shall I sell them to gain 2¢ a quart?

8. A man buys a bushel of walnuts. After he sells 2 pk. 4 qt. what fraction of the bushel has he left?

9. A dealer puts 30 gal. of milk in cans holding 1 qt. 1 pt. each. How many cans does he fill?

10. At \$36 per month, how much rent will a man pay in 1 yr. 6 mo.?

Written.

1. How much will 9 bu. 3 pk. 6 qt. 1 pt. of red currants cost at \$3 $\frac{1}{4}$ a bushel?

NOTE: First reduce 9 bu. 3 pk. 6 qt. 1 pt. to bushels and decimal of a bushel, etc.

2. Find the cost of 6 bu. 2 pk. 7 qt. 1 pt. of raspberries at \$2 $\frac{1}{4}$ a bushel.

3. Find how much 6 T. 12 cwt. 48 lb. of hay will cost at \$10 a ton.

4. How much will 2 bu. 1 pk. 3 qt. 1 pt. of raspberries cost at 8 $\frac{1}{2}$ ¢ a quart?

5. How much will 2 bu. 3 pk. 7 qt. of apples cost at 15¢ a peck?

6. How much will 9 bu. 3 pk. 6 qt. of potatoes cost at \$3.25 a bushel?

7. How much will 3 T. 15 cwt. 22 lb. of hay cost at \$8.25 a ton?

8. Find the cost of 1 bu. 2 pk. 4 qt. of cranberries at \$4.50 a bushel.

9. I sold 9 gal. 3 qt. 1 pt. of oil at $12\frac{1}{2}$ ¢ a quart. How much did I receive?

10. How much is 8 T. 16 cwt. 35 lb. of nails worth at $2\frac{1}{2}$ ¢ a pound?

Oral.

XXVII

Rapidly multiply :

37	39	41	43	69	85	26	37	48	59	70	38	49
5	4	9	8	5	6	7	8	9	4	5	7	8
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

1. 18 is $\frac{3}{4}$ of what number?

2. 27 is $.66\frac{2}{3}$ of what number?

3. 56 is $87\frac{1}{2}\%$ of what number?

4. A shepherd lost 60 of his sheep, which was 40 % of the number he had at first. How many sheep had he before losing any?

5. A man bought a horse for \$160 and sold it at a gain of $12\frac{1}{2}\%$. How much did he receive for it?

Rapidly multiply :

47	49	51	59	28	32	34	36	38	42	44	46	48
6	5	4	3	3	9	8	7	6	5	6	7	8
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

6. Find the number of which 30 is $16\frac{2}{3}\%$.

7. How many acres are in my farm if 13 % of it equals 52 acres?

8. A boy who had 40 marbles sold 15. What per cent did he sell? What per cent did he keep?

9. Hannah made a dress at the cost of \$5 and sold it for \$7. What was her gain per cent?

10. Wheat bought at \$1 per bushel was sold at a loss of 30 %. How much was received for it per bushel?

Written.

1. A grocer bought 9 bu. 3 pk. 6 qt. of berries at \$3.25 a bushel, and sold them for $12\frac{1}{2}$ ¢ a quart. How much did he gain or lose?

2. How much is gained or lost by buying 3 T. 15 cwt. 22 lb. of beef at \$18.25 a ton, and selling it for $12\frac{1}{2}$ ¢ a pound?

3. I bought 1 bu. 2 pk. 4 qt. of apples at \$4.50 a bushel and sold them at $12\frac{1}{2}$ ¢ a pint. How much did I gain or lose?

4. From a cask of molasses containing 42 gal., $33\frac{1}{3}$ % of it was drawn. How many gallons were drawn?

5. A farmer having 370 sheep sold 148 of them. What per cent of his sheep did he sell?

6. I bought 9 gal. 3 qt. 1 pt. of maple sirup at \$3 a gallon and sold it at 50¢ a quart. How much did I gain or lose?

7. How much is gained by buying 9 bu. of pears at \$4.75 a bushel and selling them for $12\frac{1}{2}$ ¢ a pint?

8. How much will a silver bar weighing $9\frac{1}{2}$ lb. (Troy) be worth at $61\frac{1}{2}$ ¢ a pennyweight?

9. A merchant bought 64 bbl. of flour for \$384 and sold it at a gain of $37\frac{1}{2}$ %. For how much per barrel did he sell it?

10. I sold my watch for \$156 and thereby lost \$26. What per cent did I lose?

XXVIII

Oral.

Rapidly answer :

$$\frac{21-9}{6}=? \quad \frac{43-7}{9}=? \quad \frac{12 \times 5}{10}=? \quad \frac{9 \times 8}{12}=?$$

$$\frac{71-11}{12}=? \quad \frac{100-20}{8}=? \quad \frac{8 \times 5}{2}=? \quad \frac{12 \times 6}{8}=?$$

1. How many days are there from Decoration Day to Independence Day?

2. If John is 12 yr. old to-day, on what date was he born?

3. A man owns $\frac{3}{4}$ of a mill and sells $\frac{1}{4}$ of his share for \$2000. How much is the mill worth?

4. I paid \$100 for a horse, which was $\frac{3}{4}$ as much as I paid for a sleigh. How much did both cost me?

5. Find approximately the measurements of the surface of your schoolroom. Find approximately the number of square feet in the floor. _____

Rapidly answer :

$$\frac{8 \times 9}{6}=? \quad \frac{20 \times 5}{10}=? \quad \frac{96 \div 8}{3}=? \quad \frac{72 \div 6}{4}=?$$

$$\frac{64 \div 20}{12}=? \quad \frac{40 \div 20}{5}=? \quad \frac{64 \div 4}{8}=? \quad \frac{84 \div 7}{6}=?$$

6. A teacher spends \$600 a year for expenses, which is $62\frac{1}{2}\%$ of her income. What is her income?

7. Mr. Scott sold a horse for \$225, which was 90 % of what he paid for it. How much did the horse cost him?

8. How many days are there from Evacuation Day (Nov. 25th) to New Year's Day (Jan. 1st)?

9. Reduce .5 gal. to gills.

10. What decimal part of a bushel is 2.5 pk.?

Written.

1. A man bequeathed to his wife \$4860, which was $\frac{1}{3}$ of his estate. What was the value of his estate?

2. Five hundred and thirty gallons, or $.41\frac{1}{3}$ of its contents, was drawn from a tank of oil. How many gallons did it originally contain?

3. Find 65 % of 468.

4. Twenty-four per cent of a farm is 736 A. How many acres are there in the farm?

5. Mr. Harvey bought flour for \$8500 with $33\frac{1}{3}$ % of his cash. How much cash had he?

6. A clerk spends \$10 a week for board, which is 25 % of his weekly salary. How much does he earn a year?

7. By selling a lot of cloth a merchant lost \$60, which was $16\frac{2}{3}$ % of the cost. If there were 600 yd. in the lot, how much did it cost him per yard?

8. A clothier sold a suit of clothes for \$27, which was $\frac{1}{16}$ of the marked price. Find the marked price.

9. A man paid \$210 for a horse, which was 70 % of what a carriage cost him. How much did he pay for both?

10. If 34 boxes of raisins cost \$29 $\frac{1}{2}$, what per cent of a box can I purchase for 12 $\frac{1}{2}$ ¢?

XXIX

Oral.

Rapidly answer :

48 is $\frac{1}{2}$ of what number ? $\frac{2}{3}$ of what number ? $\frac{3}{4}$? $\frac{4}{5}$?
 $\frac{5}{6}$? $\frac{6}{7}$?

72 is .5 of what number ? $.12\frac{1}{2}$ of what number ? $.66\frac{2}{3}$?
 $.87\frac{1}{2}$? .8 ? .75 ?

36 is 50 % of what number ? 25 % of what number ?
 75 % ? $33\frac{1}{3}$ % ? 80 % ? $66\frac{2}{3}$ % ?

1. Find $.06\frac{1}{4}$ of \$800.
 2. 4.5 is .25 times what number?
 3. When pears are worth 75¢ a bushel, how much is 1 pk. worth?
 4. Reduce .5 qt. to gills.
 5. If 5 lb. of butter cost \$1.50, how much will 2 lb. 8 oz. cost ?
-

Rapidly answer :

15 is 20 % of what number ? 25 % of what number ?
 75 % ? $12\frac{1}{2}$ % ? 60 % ? $33\frac{1}{3}$ % ?

24 is 50 % of what number ? 25 % of what number ?
 75 % ? $37\frac{1}{2}$ % ? $14\frac{2}{7}$ % ? $33\frac{1}{3}$ % ? $66\frac{2}{3}$ % ?

28 is 25 % of what number ? $28\frac{4}{5}$ % of what number ?
 20 % ? 50 % ? $33\frac{1}{3}$ % ? $66\frac{2}{3}$ % ? $12\frac{1}{2}$ % ?

6. Reduce 1 rd. 2 yd. 2 ft. to feet.
7. How many pence are there in £ $1\frac{1}{2}$?
8. What per cent of £1 is 12s. ?
9. What per cent of $\frac{5}{6}$ is $\frac{1}{2}$?
10. In $\frac{2}{3}$ yd. how many inches are there ?

Written.

1. A man paid a tax of \$1.72 per thousand on property valued at \$4000. How much tax did he pay?

2. A commission merchant received \$20 for selling \$1000 worth of produce. What was the per cent of his commission?

3. A farm was sold for \$6000, which was 125 % of the cost. How much did the farm cost?

4. From 112 cwt. 92 lb. 12 oz. take 37 cwt. 44 lb. 13 oz.

5. Divide £ 214 11s. 6d. by 24.

6. Add: 456789

324867

381243

869521

248765

432834

798123

456789

7. Add £ 5 6s. 8d. 3f., £ 10

9s. 5d. 2f., £ 24 10s. 9d. 1f.

8. Multiply 2 T. 7 cwt. 19 lb. by 8.

9. How much will 8 T. 16 cwt. 35 lb. of sugar cost at \$10½ a ton?

10. A merchant bought 250 barrels of flour at \$5.50 per barrel, and sold it at a gain of 20 %. How much did he receive for it?

Oral.**XXX**

Repeat give the per cent equivalents of:

$\frac{1}{2}$; $\frac{1}{4}$; $\frac{3}{4}$; $\frac{1}{5}$; $\frac{2}{5}$; $\frac{3}{5}$; $\frac{4}{5}$; $\frac{1}{3}$; $\frac{2}{3}$; $\frac{1}{6}$; $\frac{5}{6}$; $\frac{1}{7}$; $\frac{2}{7}$; $\frac{3}{7}$; $\frac{4}{7}$; $\frac{5}{7}$; $\frac{6}{7}$; $\frac{1}{10}$; $\frac{2}{10}$; $\frac{3}{10}$; $\frac{4}{10}$; $\frac{5}{10}$; $\frac{6}{10}$; $\frac{7}{10}$; $\frac{8}{10}$; $\frac{9}{10}$.

1. At 10¢ a square rod, how much will 1 acre of land cost?

2. A grocer having a barrel of sugar containing 200 pounds sold $\frac{1}{4}$ of it at one time and $\frac{1}{3}$ of the remainder at another time. What per cent remained unsold?

3. If 2 bu. of walnuts cost \$6, how much will 3 pk. cost?

4. Twenty-five bushels is $62\frac{1}{2}\%$ of how many bushels?

5. If 12 trees are 25 % of the number planted by a fruit grower, how many trees did he plant?

Rapidly give the per cent equivalents of:

$1\frac{1}{2}$; $1\frac{1}{3}$; $1\frac{1}{4}$; $1\frac{1}{5}$; $2\frac{1}{8}$; $1\frac{1}{6}$; $2\frac{1}{7}$; $1\frac{1}{12}$; $1\frac{3}{8}$; $2\frac{3}{4}$; $1\frac{3}{5}$; $2\frac{4}{5}$; $2\frac{2}{3}$; $2\frac{1}{50}$; $2\frac{1}{25}$.

6. A fruit grower planted 120 apple trees, 20 of which died. What per cent of the trees lived?

7. A cow was sold at a gain of \$10, which was 25 % of the cost. Find the cost.

8. In $37\frac{1}{2}\%$ of a farm there are 90 acres. How many acres are there in the farm?

9. At 10s. 6d. a yard, how much will 8 yd. of cloth cost?

10. From $\frac{7}{8}$ of a bushel of cranberries there was sold 3 pk. 2 qt. How much was the remainder worth at 12¢ a quart?

Written.

1. I bought 5 gal. 3 qt. 1 pt. of molasses at \$5.75 a gallon. How much did all cost?

2. How much will 2 bu. 1 pk. 6 qt. of strawberries cost at 14¢ a quart?

3. A grocer bought 9 bu. 3 pk. 6 qt. 1 pt. of beans at \$4.25 a bushel, and sold them at $12\frac{1}{2}$ ¢ a pint. How much did he gain?

4. A grocer bought 24 tubs of butter averaging 30 lb. each, at 24¢ per pound, and sold this butter at a gain of $16\frac{2}{3}$ %. How much did he receive for it?

5. A farmer sold 224 bu. of rye, which was 40% of his entire crop. What was his entire crop?

6. I bought 4 bu. 2 pk. of peanuts for \$8.64. I sold them at 10¢ a pint. Find the gain or loss in money and in per cent.

7. A dealer bought 3 bbl. of flour at \$15 a barrel and sold it at 12¢ a pound. How much money was gained?

8. A farmer put 125 bu. 3 pk. 6 qt. of wheat into bags each holding 1 bu. 3 pk. 6 qt. How many bags were used?

9. If \$25 is $6\frac{1}{4}$ % of my money, how much money have I?

10. A peddler bought 150 melons, and sold all but 40 melons. What per cent of his stock did he sell?

XXXI

Oral.

Rapidly answer:

$\frac{1}{2} + \frac{1}{8} = ?$	$\frac{1}{2} - \frac{1}{8} = ?$	$\frac{1}{2} \times \frac{1}{8} = ?$	$\frac{1}{2} \div \frac{1}{8} = ?$
$\frac{2}{3} + \frac{1}{2} = ?$	$\frac{2}{3} - \frac{1}{2} = ?$	$\frac{2}{3} \times \frac{1}{2} = ?$	$\frac{2}{3} \div \frac{1}{2} = ?$
$\frac{1}{4} + \frac{1}{2} = ?$	$\frac{3}{4} - \frac{1}{2} = ?$	$\frac{3}{4} \times \frac{1}{2} = ?$	$\frac{3}{4} \div \frac{1}{2} = ?$
$\frac{1}{5} + \frac{1}{4} = ?$	$\frac{5}{8} - \frac{1}{4} = ?$	$\frac{5}{8} \times \frac{1}{4} = ?$	$\frac{5}{8} \div \frac{1}{4} = ?$

How many grains are there in 1 lb. Troy? in 1 oz. Troy? How many grains are there in 1 lb. avoirdupois? in 1 oz. avoirdupois? Compare 1 lb. avoirdupois weight with 1 lb. Troy weight. For what kind of articles is avoirdupois weight used? For what kind of articles is Troy weight used? Repeat the table of Troy weight; of avoirdupois weight.

1. How many more grains are there to a pound avoirdupois than there are to a pound Troy.

2. I have 14000 grains (Troy). How many avoirdupois pounds have I?

3. I gave 3 cwt. of hay, worth \$20 a ton, for butter worth 30¢ a pound. How many pounds of butter did I get?

4. What decimal part of a gallon is 2 qt. 1 pt.? 3 qt. 1 pt. 2 gi.?

5. The dividend is .4, the divisor is 80. What is the quotient?

Rapidly give the results:

$\frac{2}{3} + \frac{1}{4}$	$\frac{2}{3} - \frac{1}{4}$	$\frac{2}{3} \times \frac{1}{4}$	$\frac{2}{3} \div \frac{1}{4}$
$\frac{5}{6} + \frac{1}{3}$	$\frac{5}{6} - \frac{1}{3}$	$\frac{5}{6} \times \frac{1}{3}$	$\frac{5}{6} \div \frac{1}{3}$
$\frac{1}{5} + \frac{1}{6}$	$\frac{1}{5} - \frac{1}{6}$	$\frac{1}{5} \times \frac{1}{6}$	$\frac{1}{5} \div \frac{1}{6}$
$\frac{3}{4} + \frac{2}{3}$	$\frac{3}{4} - \frac{2}{3}$	$\frac{3}{4} \times \frac{2}{3}$	$\frac{3}{4} \div \frac{2}{3}$

6. How much will 14 lb. of cloves cost at the rate of $3\frac{1}{2}$ lb. for 50¢? (Use the ratio method.)

7. How far will a man drive in $5\frac{1}{3}$ hr. at the rate of 21 mi. in $3\frac{1}{2}$ hr.? (Analyze the solution.)

8. What per cent of £1 is 30*d.*?

9. $\frac{1}{3} = \frac{?}{100}$ of $\frac{5}{8}$?

10. How much will 10 reams of paper cost at 20*¢* a quire?

Written.

Change 5 lb. 6 oz. 4 pwt. 12 gr. to pounds and ounces (avoir.).*

1. Change 3 lb. 8 oz. 16 pwt. to pounds and ounces (avoir.).

2. Change 4 lb. 9 oz. 12 pwt. 18 gr. to pounds and ounces (avoir.).

3. Change 5 lb. 8 oz. 12 pwt. 22 gr. to pounds and ounces (avoir.).

4. Change 10 lb. 8 oz. (Troy) to pounds and ounces (avoir.).

5. Multiply £8 18*s.* 9*d.* 3*f.* by 24.

6. Reduce 5 lb. 8 oz. 16 pwt. to pounds and ounces (avoir.).

7. How many pounds and ounces (avoir.) are there in 56 Troy pounds?

*** SUGGESTIVE METHOD:**

$$5 \times 5760 \text{ gr.} = 28800 \text{ gr.}$$

$$6 \times 480 \text{ gr.} = 2880 \text{ gr.}$$

$$4 \times 24 \text{ gr.} = 96 \text{ gr.}$$

$$12 \text{ gr.} = 12 \text{ gr.}$$

$$31788 \text{ gr.}$$

$$\cancel{7000} 31788 (4 \text{ lb.}$$

$$28$$

$$487.5 \overline{) 31788.0} (8 + \text{oz.}$$

$$35000$$

Ans. 4 lb. 8 oz. + (avoir.)

8. Change 10 lb. 6 oz. Troy to pounds and ounces avoirdupois.

9. If 26 casks contain 21 hhd. 11 gal. 2 qt. 1 pt., how much does each cask contain?

10. From 27 lb. 7 oz. 15 pwt. take 13 lb. 9 oz. 18 pwt.

XXXII

Oral.

Rapidly find:

$12\frac{1}{2}\%$ of 80	$66\frac{2}{3}\%$ of 15	$14\frac{3}{4}\%$ of 28	1 % of 800
25 % of 32	$6\frac{1}{4}\%$ of 32	$62\frac{1}{2}\%$ of 56	$\frac{1}{2}\%$ of 800
$33\frac{1}{3}\%$ of 75	$37\frac{1}{2}\%$ of 24	$28\frac{3}{4}\%$ of 49	50 % of 800
50 % of 144	$8\frac{1}{3}\%$ of 36	2 % of 200	$1\frac{1}{2}\%$ of 800

1. The smaller of two numbers is $5\frac{7}{10}$ and the difference between them is $\frac{4}{5}$. What is the greater number?

2. Reduce $6\frac{5}{12}$ to a decimal.

3. I exchange 10 lb. of butter at 25¢ a pound for calico worth $6\frac{1}{4}$ ¢ a yard. How many yards did I receive?

4. John found 60¢ which was $\frac{3}{4}$ of $\frac{1}{2}$ of what he then had. How much had he at first?

5. If $2\frac{1}{2}$ oz. of spices cost $\$ \frac{1}{5}$, how much will a pound cost?

Rapidly find:

50 % of $\frac{1}{2}$	$12\frac{1}{2}\%$ of $\frac{1}{4}$	75 % of $\frac{1}{3}$	20 % of $\frac{3}{4}$
25 % of $\frac{1}{8}$	$37\frac{1}{2}\%$ of $\frac{1}{2}$	$16\frac{2}{3}\%$ of $\frac{2}{3}$	40 % of $\frac{2}{3}$
$33\frac{1}{3}\%$ of $\frac{1}{4}$	$62\frac{1}{2}\%$ of $\frac{3}{8}$	$14\frac{3}{4}\%$ of $\frac{1}{2}$	60 % of $\frac{1}{2}$
$66\frac{2}{3}\%$ of $\frac{1}{5}$	$87\frac{1}{2}\%$ of $\frac{2}{3}$	$28\frac{3}{4}\%$ of $\frac{2}{3}$	80 % of $\frac{3}{4}$

6. Reduce $\frac{3}{4}$ yd. to whole numbers of a lower denomination.

7. In $\frac{3}{4}$ yd. how many inches are there?

8. If 3 pk. of potatoes cost 60 ¢, how much will 1 bu. cost?

9. How many rods of fence will be required to inclose a lot $6\frac{1}{2}$ rd. long and $4\frac{1}{2}$ rd. wide?

10. How many hours and minutes are you in school during one school week of five days, counting 5 hr. to the day?

Written.

Change 5 lb. 8 oz. (avoir.) to Troy weight.*

1. Change 10 lb. 8 oz. (avoir.) to Troy weight.

2. Find the value in Troy weight of 9 lb. 10 oz. (avoir.).

3. Reduce 10 lb. 7 oz. (avoir.) to Troy weight.

4. How much will a coffee urn weighing 2 lb. 14 oz. (avoir.) cost at \$1.80 per ounce (Troy)?

5. From £ 18 17s. 9d. 3f. take £ 15 19s. 10d. 2f.

6. How many pounds Troy are there in 144 lb. avoirdupois?

7. Reduce 9 lb. 8 oz. 16 pwt. 22 gr. to pounds and ounces (avoir.).

* SUGGESTED METHOD:

$$5 \times 7000 \text{ gr.} = 35000 \text{ gr.}$$

$$8 \times 437\frac{1}{2} \text{ gr.} = 3500 \text{ gr.}$$

$$38500 \text{ gr.}$$

$$5760)38500(6 \text{ lb.}$$

$$3456$$

$$480)3940(8 \text{ oz.}$$

$$384$$

$$24)100(4 \text{ pwt.}$$

$$96$$

$$4 \text{ gr.}$$

8. How much will 5 lb. 14 oz. avoirdupois cost at \$2.40 per ounce Troy?

9. A grocer bought 8 lb. of figs at $12\frac{1}{2}$ ¢ a pound. He sold them at $16\frac{1}{4}$ ¢ a pound. How much did he gain?

10. Find the cost of $\frac{1}{8}$ of $2\frac{1}{2}$ yd. at $\frac{3}{4}$ of \$5 a yard.

XXXIII

Oral.

Rapidly find the per cent that

16 is of 48	24 is of 36	20 is of 80	8 is of 56
27 is of 35	24 is of 48	50 is of 100	8 is of 28
14 is of 49	16 is of 32	12 is of 144	17 is of 51
48 is of 92	15 is of 75	4 is of 64	13 is of 39

What is distance north of the equator called? south of the equator?

What is distance west of a prime meridian called? east of a prime meridian?

If one place is situated 4 degrees north and another place 20 degrees north of the equator, what is the distance in degrees between them? (Refer to a terrestrial globe.) If one city is 20 degrees south and another city 50 degrees south, what is the distance in degrees between them? If a town is 20 degrees north of the equator and another town is 30 degrees south, how far apart are they in degrees?

1. James lives 2 miles north of the schoolhouse and Robert lives $2\frac{1}{2}$ miles south of the schoolhouse. How many miles is it from James's house to Robert's?

2. Mary lives $\frac{1}{2}$ of a mile east of a church and Jane lives $\frac{3}{4}$ of a mile west of the same church. How far will Mary have to walk when she goes to see Jane?

3. One day William and Henry started to walk north from the same place. William walked $5\frac{1}{4}$ miles and Henry walked $8\frac{1}{2}$ miles. How far apart were they at the end of the day?

4. A city situated 8 degrees east of the prime meridian is how far from a city situated 12 degrees west?

5. A city situated 8 degrees east of the prime meridian is how far from a city situated 20 degrees farther east?

Rapidly find the per cent that

12 is of 48	48 is of 200	28 is of 140	35 is of 70
24 is of 56	48 is of 500	28 is of 200	35 is of 105
48 is of 96	48 is of 480	28 is of 1400	35 is of 700
48 is of 144	28 is of 84	28 is of 560	35 is of 210

6. Albany is approximately 73° west longitude and Berlin 13° east longitude. What is the distance between them?

7. Cincinnati is approximately 84° west longitude and Chicago 87° west longitude. What is the distance between them?

8. Mr. Brown has 40 cows, which is $\frac{4}{5}$ of the number Mr. Ford has. How many have both?

9. A ten-acre lot is 20 rd. wide. How long is it?

10. What per cent of 5 lb. of tea is 12 oz.?

Written.

1. Find the distance in degrees, etc. between latitude $56^{\circ} 18' 20''$ N. and latitude $14^{\circ} 25' 18''$ N.

2. Find the distance in degrees, etc. between latitude $47^{\circ} 15' 25''$ N. and latitude $15^{\circ} 23' 18''$ S.

3. The latitude of Richmond, Va. is $37^{\circ} 20'$ N. and of Savannah is $32^{\circ} 4' 56''$ N. Find the distance in degrees, etc. between them.

4. The latitude of New York is $40^{\circ} 24' 40''$ N. and of Montreal $45^{\circ} 35'$ N. Find the distance in degrees, etc. between them.

5. New York is in latitude $40^{\circ} 24' 40''$ N. and Quito $13^{\circ} 27''$ S. How far apart in degrees, etc. are they?

6. The latitude of Charleston, S.C. is $32^{\circ} 46' 33''$ N. and of Savannah is $32^{\circ} 4' 56''$ N. Find the distance in degrees, etc. between them.

7. The latitude of Cape Horn is $55^{\circ} 59'$ S.; that of Cape Cod is $42^{\circ} 1' 57''$ N. What is the distance in degrees, etc. between them?

8. The longitude of Portland is $70^{\circ} 13' 34''$ W. and of Mobile $88^{\circ} 1' 29''$ W. How far apart in degrees, etc. are they?

9. St. Paul, Minn. is situated in longitude $93^{\circ} 4' 55''$ W. and Berlin $13^{\circ} 23' 45''$ E. Find the distance in degrees, etc. between them.

10. Divide 282 bu. 3 pk. 1 qt. 1 pt. by 9.

XXXIV

Oral.

Rapidly find the number of which:

24 is $12\frac{1}{2}\%$; 50% ; 25% ; $33\frac{1}{3}\%$; 75% ; $37\frac{1}{2}\%$; $66\frac{2}{3}\%$; $16\frac{2}{3}\%$.

72 is 25% ; $33\frac{1}{3}\%$; 75% ; $66\frac{2}{3}\%$; 20% ; 60% ; 80% ; $37\frac{1}{2}\%$.

If a man can do a piece of work in 4 da., what part of it can he do at the same rate in 1 da.? If another man can do the same work in 3 da., what part of it can he do at the same rate in 1 da.? What part of the work can they both do in 1 da.? Since $\frac{1}{4}$ represents the work to be done and $\frac{1}{3}$ represents the work done by both in 1 da., how long will they take to do the work when they both work together?

1. A can do a piece of work in 6 da. and B can do it in 4 da. How long will it take them both working at these rates to do it?

2. A can build a wall in 5 da. and B can build it in 6 da. How long will it take them both working together at these rates?

3. If it takes a man $2\frac{1}{2}$ da. to do a piece of work, how much of it can he do at this rate in a day?

4. One half of a peck of oats is what part of a bushel?

5. What is the difference between .25 and .2 of .3?

Rapidly find the number of which:

16 is 4% ; 25% ; $12\frac{1}{2}\%$; $33\frac{1}{3}\%$; $66\frac{2}{3}\%$; 20% ; 40% ; $14\frac{2}{7}\%$.

25 is 5% ; 2% ; $83\frac{1}{3}\%$; $16\frac{2}{3}\%$; $14\frac{2}{7}\%$; $12\frac{1}{2}\%$; 25% ; $33\frac{1}{3}\%$.

6. If B can do a piece of work in 3 da. and C in 6 da., how much can they do together at these rates in 1 da.?

7. Robert uses a ream of typewriting paper in 8 da. and William uses one in 6 da. How many days at these rates would a ream last them both?

8. A cow cost \$24, which is $\frac{3}{4}$ of $\frac{4}{5}$ of the cost of both the cow and a calf. How much did the calf cost?

9. One third of $\frac{1}{5}$ of the height of the Washington monument is 37 ft. What is the height?

10. How many hours will it take a boy to walk 20 mi., at the rate of $2\frac{1}{2}$ mi. an hour?

Written.

1. The longitude of Chicago is $87^{\circ} 37' 37''$ W. and of Cambridge, Mass. is $71^{\circ} 7' 40''$ W. Find the distance in degrees, etc. between them.

2. The longitude of Paris is $2^{\circ} 20'$ E. and of New York is $74^{\circ} 3''$ W. How far apart are they in degrees, etc.?

3. Multiply 15 bu. 3 pk. 1 qt. by 6.

4. How much will 21672 lb. of iron cost at \$2.80 a ton?

5. If A can do a piece of work in 12 da. and B in 8 da., how long will it take them both working together at these rates?

6. What is the distance in degrees, etc. between New Orleans, which is 90° W., and Geneva, which is $6^{\circ} 9' 5''$ E.?

7. Add 10 A. 84 sq. rd. 16 sq. yd., 19 A. 72 sq. rd. 18 sq. yd., 36 A. 15 sq. rd. 9 sq. yd.

8. How many bushels of oats worth $\$ \frac{2}{3}$ a bushel, will pay for $\frac{4}{5}$ of a barrel of flour at $\$ 7 \frac{2}{3}$ a barrel?

9. $2 \frac{5}{8} = \frac{?}{100}$ of $3 \frac{1}{8}$?

10. Divide $\frac{3}{4}$ of $3 \frac{1}{2}$ by $6 \frac{1}{4} - 3 \frac{2}{3}$.

XXXV

Oral.

24 is $66 \frac{2}{3} \%$ of what number? 36 is $66 \frac{2}{3} \%$ of what number? 48? 16? 32? 72? 64? 12?

15 is 75% of what number? 27 is 75% of what number? 36? 21? 24? 18? 12? 30?

1. A can do a piece of work in 4 da. and B can do the same work in 2 da. How long will it take them if they work together at these rates?

2. I spent $\frac{5}{8}$ and $\frac{1}{12}$ of my money and gave away $\frac{1}{24}$. How much of my money remained?

3. If a man saves $\frac{5}{8}$ of his income, what per cent does he spend?

4. An auctioneer sold goods to the amount of \$500. How much did his commission amount to at $2 \frac{1}{2} \%$?

5. If a man buys a horse for \$90, for how much must he sell it to gain 20% ? _____

16 is 80% of what number? 28 is 80% of what number? 20? 80? 32? 36? 48? 72?

28 is $87 \frac{1}{2} \%$ of what number? 14 is $87 \frac{1}{2} \%$ of what number? 70? 140? 63? 49? 84? 35?

6. James walked a distance of $12 \frac{1}{2}$ mi. in 5 hr. How many miles an hour did he walk?

7. How much does 6 bu. 3 pk. of corn cost at 80¢ a bushel?

8. One seventh of a pole was broken off by the wind, $\frac{1}{8}$ of it was in the mud, and the remainder was in the air. What part of it was in the air? (Make a diagram showing the parts.)

9. What per cent is gained by selling clover seed for \$6 that cost \$4?

10. Seven eighths of 40 is $\frac{5}{8}$ of what number?

Written.

1. How much can be gained by buying 10 lb. of rhubarb at \$6.50 a pound avoirdupois and selling it at 50¢ an ounce?

2. In 9 lb. Troy how many pounds avoirdupois are there?

3. The longitude of Paris is $2^{\circ} 20'$ E., and of Washington, D.C. is $77^{\circ} 15''$ W. Find the difference of longitude.

4. How old was George Washington when the Declaration of Independence was signed?

5. If A can do a piece of work in 14 da. and B can do the same work in 21 da., how long will it take them if they work together at these rates?

6. A grocer bought 6 lb. of grapes at $18\frac{1}{2}$ ¢ a pound and sold them at 20¢ a pound. How much did he gain?

7. How many spoons, each weighing 1 oz. avoirdupois, can be made from 1 lb. 9 oz. 17 pwt. 12 gr. of silver?

8. The longitude of Philadelphia is $75^{\circ} 9' 5''$ W., and of Cincinnati is $84^{\circ} 29' 31''$ W. Find how far apart in degrees, etc. they are.

9. What time elapsed from the discovery of America by Columbus to the landing of the Pilgrims?

10. If A can do a piece of work in 12 da. and B can do the same work in 8 da., how long will it take them both working together at these rates?

XXXVI

Oral.

Rapidly find the exact number of days from

Jan. 26 to Feb. 8	Nov. 25 to Jan. 8
Jan. 17 to Feb. 15	March 28 to May 10
Sept. 28 to Oct. 18	June 8 to Aug. 5
Oct. 18 to Nov. 25	May 26 to July 10
April 8 to May 12	Dec. 25 to Feb. 12
June 12 to July 21	April 22 to June 14

How many square inches are there in a square foot?
How many square feet are there in a square yard? How
many square rods are there in an acre? in 2 A.? in $\frac{1}{2}$ A.?

How many square inches are there in a sheet of paper
8 in. wide and 12 in. long?

Tell how to find the area of a square or of a rectangle.

1. How many square feet are there in a rectangle 9 ft.
long and 7 ft. wide?

2. Measure the blackboard and find how many square
feet there are in its surface.

3. How many square feet are there in a ceiling 18 ft.
long and 10 ft. wide?

4. How many square yards are there in a wall 24 ft. long and 9 ft. high?

5. At 3¢ a square foot how much must be paid for 10 boards, each 16 ft. long and $\frac{1}{2}$ ft. wide?

Rapidly find the time from

May 30 to June 28

Dec. 25 to Feb. 12

Jan. 21 to Feb. 22

Sept. 9 to Nov. 6

April 12 to May 15

April 23 to June 9

Sept. 9 to Oct. 12

Oct. 12 to Dec. 25

Oct. 12 to Nov. 6

May 30 to July 4

Dec. 25 to New Year's Day

June 25 to Aug. 6

6. How many acres are there in a field 40 rd. square?

7. How many square feet are there approximately in the ceiling of your class room?

8. How many square yards of surface are there in a fence 60 ft. long and 6 ft. high?

9. There are how many square feet in 5 boards each 18 ft. long and $\frac{1}{2}$ a foot wide?

10. Four square rods is what decimal part of an acre?

Written.

1. Find the cost of covering a hall 45 ft. long, $6\frac{1}{2}$ ft. wide, at \$1.20 a square yard.*

2. How much will it cost to flag a street 156 ft. long by $6\frac{1}{2}$ ft. wide, at \$2.40 a square yard?

* SUGGESTION : $\frac{\$1.20}{1} \times \frac{45}{1} \times \frac{13}{2} \times \frac{1}{9} = ?$ (Cancellation method.)

3. What is the cost of painting a ceiling 18 ft. square, at $62\frac{1}{2}$ ¢ a square yard?
4. How many acres are there in a field 90 rd. long and 75 rd. wide?
5. How much will a piece of land 60 rd. square cost at \$75 an acre?

6. How many square yards of carpet will cover a floor 15 ft. by 12 ft.?
7. How much will a board 14 ft. by $2\frac{1}{2}$ ft. cost at 6¢ a square foot?
8. How much will a farm $189\frac{1}{2}$ rd. by 150 rd. be worth at \$648 $\frac{1}{2}$ an acre?
9. Find the cost of slating a mansard roof 40 ft. by 20 ft., both sides, at \$1.40 a square foot.
10. How much will it cost to paint a roof 52 ft. by 30 ft., at 75¢ a square (100 sq. ft.)?

XXXVII

Oral.

Rapidly find the area in square yards of each of the following rectangles:

Base, 18 ft.; alt. 5 ft.	Base, 27 ft.; alt. 15 ft.
Base, 20 ft.; alt. 9 ft.	Base, 30 ft.; alt. 9 ft.
Base, 5 yd.; alt. 7 yd.	Base, 16 yd.; alt. 8 yd.
Base, 8 yd.; alt. 9 yd.	Base, 28 ft.; alt. 9 ft.
Base, 15 ft.; alt. 12 ft.	Base, 12 yd.; alt. 8 yd.
Base, 30 yd.; alt. 20 yd.	Base, 24 yd.; alt. 6 yd.

1. How much will $.87\frac{1}{2}$ of a pound of tea cost at 80¢ a pound?
2. How many gills are there in .5 of a pint?

3. A and B can build a wall in 6 days. A alone can build it in 9 days. How long will it take B alone to build it?

4. A piece of carpet 12 yd. long and $2\frac{1}{2}$ ft. wide contains how many square feet? how many square yards?

5. Name a common multiple of 6, 8, 12; of 2, 3, 4.

Rapidly find the area in square yards of each of the following parallelograms:

Base, 20 ft.; alt. 18 ft.	Base, 15 ft.; alt. 15 ft.
Base, 15 yd.; alt. 20 yd.	Base, 8 yd.; alt. 9 yd.
Base, 30 ft.; alt. 30 ft.	Base, 27 ft.; alt. 3 yd.
Base, 8 yd.; alt. 6 ft.	Base, 8 yd.; alt. 18 ft.
Base, 15 ft.; alt. 8 yd.	Base, 50 ft.; alt. 9 ft.
Base, 25 yd.; alt. 8 yd.	Base, 20 yd.; alt. 36 yd.

6. Six sevenths of 35 is $\frac{5}{8}$ of how many times 12?

7. How many square inches are there in the entire surface of a 6 in. cube?

8. Two bushels of walnuts bought at \$3 a bushel and sold at 20¢ a quart will produce how much gain?

9. How much will the case of a gold watch cost which weighs $1\frac{1}{2}$ oz., at \$1.50 a pennyweight, allowing \$15 for making the case?

10. At 10¢ a yard how much will it cost to inclose with a fence a lot of land $5\frac{1}{2}$ rd. square?

Written.

1. How many tiles 8 by 8 in. will be used in laying a floor 48 ft. by 10 ft.?^{*}

* SUGGESTION: $\frac{48}{1} \times \frac{10}{1} \times \frac{144}{1} \times \frac{1}{8 \times 8} = ?$ (Cancellation method.)

2. How many bricks 8 in. by 4 in. will pave a walk 16 ft. by 4 ft.?

3. How many planks each 16 ft. long and $\frac{3}{4}$ ft. wide will cover a floor 36 ft. by 24 ft.?

4. A township is 4 mi. by $3\frac{1}{2}$ mi. How many farms of 80 A. each will it make? (640 A. = 1 sq. mi.)

5. How many rods of fence will inclose a field 1 mi. square?
—

6. How many tiles 10 in. square will lay a floor 32 ft. 5 in. by 32 ft. 6 in.?

7. How many acres are there in a rectangular meadow 725 rd. long by 400 rd. wide?

8. What is the cost of a piece of land 80 rd. by 75 rd. at \$62 $\frac{1}{2}$ an acre?

9. How much will land 80 rd. by 75 rd. cost at \$68 $\frac{1}{2}$ an acre?

10. From $\frac{5}{8}$ of a yard take $\frac{1}{2}$ of a foot.

XXXVIII

Oral.

Rapidly find the areas in square yards of triangles having these dimensions:

Base, 8 yd.; altitude, 90 yd.

Base, 6 ft.; altitude, 50 ft.

Base, 32 yd.; altitude, 4 yd.

Base, 5 yd.; altitude, 10 yd.

Base, 18 ft.; altitude, 8 yd.

Base, 16 ft.; altitude, 20 ft.

Base, 100 yd.; altitude, 100 yd.

Base, 50 ft.; altitude, 18 ft.

How many strips of carpet 1 yd. wide will it take to cover a floor 6 yd. wide? If the strips are 27 in. or $\frac{3}{4}$ yd. wide, how many strips will it take? If the floor is 7 yd. long, how many yards of carpet will it take to cover the floor?

1. How many strips of carpet 27 in. wide will it take to cover a floor 18 ft. wide?

2. How many strips of carpet $\frac{3}{4}$ yd. wide will it take for a floor 54 ft. wide?

3. How many yards of carpet must I buy to cover a parlor floor 21 by 18 ft. with carpet $\frac{3}{4}$ yd. wide?

4. How much will it cost to carpet a parlor floor, the dimensions being the same as those in Example 3, the carpet being the same width and costing \$1.50 a yard?

5. What per cent of 27 is 20 % of 45?

Rapidly find the area in square yards of triangles having these dimensions :

Base, 30 ft. ; altitude, 20 ft.

Base, 15 ft. ; altitude, 20 ft.

Base, 50 yd. ; altitude, 10 yd.

Base, 20 yd. ; altitude, 15 yd.

Base, 8 yd. ; altitude, 9 yd.

Base, 5 yd. ; altitude, 18 ft.

Base, 100 yd. ; altitude, 100 yd.

Base, 60 ft. ; altitude, 60 ft.

6. A room is 21 ft. wide. How many strips of carpet a yard wide will be needed to carpet the room?

7. A room is 18 ft. long and 12 ft. wide. How many strips of carpet $\frac{3}{8}$ of a yard wide will be needed, the strips running lengthwise?

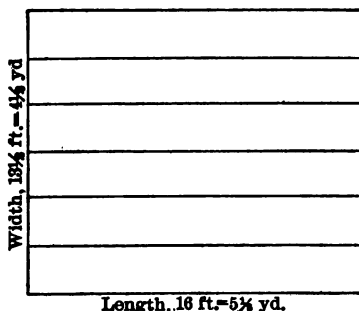
8. 25% of \$24 is what per cent of \$200?

9. How many times 4 is $\frac{4}{5}$ of $\frac{5}{6}$ of 18?

10. The area of a triangle is 30 sq. rd. If the base is 12 rd., how many rods is the altitude?

Written.

How much will it cost to carpet a room $13\frac{1}{2}$ ft. wide and 16 ft. long, the strips running lengthwise, and the carpet being a plain pattern 27 in. wide and worth \$1.50 a yard?



SOLUTION

$$4\frac{1}{4} \text{ yd.} + \frac{3}{4} \text{ yd.} = \frac{3}{2} \times \frac{4}{3} = 6, \\ \text{number of strips.}$$

$$5\frac{1}{3} \text{ yd.} \times 6 = \frac{16}{3} \text{ yd.} \times 6 = 32 \text{ yd.}$$

SUGGESTION:

cost of a yard \times number of yards
in the length \times number strips
= *Ans.*

$$\begin{aligned} \$1\frac{1}{2} \times 32 &= \$\frac{3}{2} \times \frac{16}{1} \\ &= \$48. \text{ Ans.} \end{aligned}$$

$$\$1\frac{1}{2} \times 5\frac{1}{3} \times 6 = \$48.$$

EXPLANATION

Strips run lengthwise unless otherwise stated.

Divide the width of the room in yards by the width of the carpet in yards and get the number of strips required.* Multiply the number of strips by the number of yards in the length of the room and the result will be the number of yards of carpet required. Multiply the price of 1 yd. by the number of yards to find the cost of the carpet.

1. Find the cost of carpeting a room 18 ft. by 22 ft. with carpet 27 in. wide, at \$.90 a yard.
2. How much will it cost to carpet a room 30 ft. by 20 ft. with carpet $\frac{3}{4}$ of a yard wide, at \$.80 a yard?
3. How much will it cost to carpet a room $18\frac{1}{2}$ ft. by 15 ft. with carpet $\frac{3}{4}$ of a yard wide, worth \$1 a yard?
4. At \$1.50 a yard how much will carpet 27 in. wide cost for covering a room 35 ft. long and 24 ft. wide?
5. How many rails 18 ft. long are required for a track 15 mi. long?
6. How much will it cost to carpet a room 40 ft. by 36 ft. with carpet $\frac{3}{4}$ yd. wide, at \$.96 a yard?
7. Find the cost of carpeting a room 19 ft. 8 in. long and 15 ft. wide with plain carpet 27 in. wide, at 75¢ a yard.
8. How much will it cost to carpet a room 22 ft. 6 in. long by 18 ft. 9 in. wide with carpet 1 yd. wide, at \$1.50 a yard?
9. How much will it cost to carpet a room 24 ft. by 18 ft. with carpet 1 yd. wide, at \$1.25 a yard?
10. How much will it cost to carpet a room 30 ft. by 20 ft. with carpet 1 yd. wide, at \$1 a yard?

* A fraction of a strip must be counted as a full strip.

Thus, $6\frac{1}{2}$ strips would be counted as 7 strips.

XXXIX**Oral.**

Rapidly find the number of yards of carpet required for rooms having the following dimensions :

Length, 18 ft. ; width, 12 ft. ; carpet 1 yd. wide.

Length, 17 ft. ; width, 15 ft. ; carpet 1 yd. wide.

Length, 18 ft. ; width, 15 ft. ; carpet 1 yd. wide.

Length, 15 ft. ; width, 12 ft. ; carpet $\frac{3}{4}$ yd. wide.

Length, 21 ft. ; width, 18 ft. ; carpet $\frac{3}{4}$ yd. wide.

Length, 30 ft. ; width, 20 ft. ; carpet 1 yd. wide.

Length, 21 ft. ; width, 7 ft. ; carpet 1 yd. wide.

Length, 16 ft. ; width, 11 ft. ; carpet 1 yd. wide.

Length, 20 ft. ; width, 16 ft. ; carpet 1 yd. wide.

Length, 18 ft. ; width, 15 ft. ; carpet $\frac{3}{4}$ yd. wide.

1. How much change shall I receive from a \$2 bill if I buy $6\frac{1}{2}$ lb. of beef at 18¢ a pound ?

2. Five twelfths of 60 is how many times 5 ?

3. At the rate of \$4 $\frac{1}{2}$ for 6 lb. of tea, how much shall I have to pay for 12 lb. ?

4. A grocer bought eggs for 20¢ a dozen and sold them for 25¢ a dozen. What per cent did he gain ?

5. How many quarts of milk can I buy for 30¢ at the rate of 5¢ for a pint ? _____

Rapidly find the cost of carpeting the rooms having dimensions as given at the beginning of this lesson at \$1.00, \$1.50, \$1.25, and 75¢ a yard.

6. How many square yards are there in the ceiling of a room 15 ft. by 12 ft. ?

7. How much will it cost to fence a field 20 rd. by 40 rd. at $37\frac{1}{2}$ ¢ a rod?

8. What per cent does a merchant lose when he sells goods at $\frac{2}{3}$ of their cost?

9. A lady sold her horse and carriage for \$700, thereby losing \$100. What per cent did she lose?

10. A hatter sold caps at a loss of 50¢ each, which was $12\frac{1}{2}\%$ of what they cost him. What was the cost of each cap?

Written.

1. How many yards of carpet $\frac{3}{4}$ yd. wide will carpet a parlor 35 ft. long by 18 ft. wide, if the matching of figures requires 6 in. waste? (The first strip is always laid without waste for matching.)*

2. A lady wishes to carpet a room 14 ft. 6 in. long by 11 ft. wide with Brussels carpet $\frac{3}{4}$ of a yard wide, at \$1.25 a yard. How much will the carpet cost if 15 in. is allowed on each strip, except the first, for matching?

3. At \$.96 a yard find the cost of carpeting a room 16 ft. by 15 ft. with carpet 27 in. wide, if 6 in. waste is allowed for matching.

4. How many yards of velvet carpeting, $1\frac{1}{2}$ yd. wide, will cover a parlor 24 ft. 9 in. long and $17\frac{1}{2}$ ft. wide, if the strips run lengthwise and the matching of the figures wastes 9 in.?

* SOLUTION: After finding, in the usual way, the number of yards of carpet needed, find how many extra yards must be bought to allow for matching all strips except the first; and add these to the number of yards. In this example, $98\frac{1}{2}$ yd. are required before matching. There are 8 strips in all; therefore 7×6 in., or 42 in., which equals $1\frac{1}{2}$ yd., will be required for matching. $98\frac{1}{2}$ yd. + $1\frac{1}{2}$ yd. = ?

5. From 121 hhd. 28 gal. 1 qt. take 63 hhd. 21 gal. 3 qt.

6. How many yards of Brussels carpet $\frac{3}{4}$ yd. wide will cover a floor 24 ft. 9 in. long by $17\frac{1}{2}$ ft. wide, and what will be the cost at \$1.80 a yard, if the strips run the usual way, and the matching of the figure requires 6 in. waste?

7. Find the cost of covering the floor of a hall $46\frac{1}{2}$ ft. long and 14 ft. 9 in. wide with matting $1\frac{1}{4}$ yd. wide, at \$.25 a yard.

8. How many sods, each 16 in. square, will be required to turf a yard 53 ft. 4 in. long and 28 ft. wide?

9. Find the cost of slating a roof 62 ft. 6 in. long and 48 ft. wide, at \$15.75 a square (100 sq. ft.).

10. Add £ 16 12s. 5d., £ 127 13s. 7d., £ 192 18s. 10d., £ 168 14s. 11d.

XL

Oral.

Rapidly multiply:

$.16\frac{2}{3}$ by 54	$.62\frac{1}{2}$ by 32	$1.33\frac{1}{3}$ by 24
.25 by 240	$.87\frac{1}{2}$ by 88	$1.12\frac{1}{2}$ by 16
$.33\frac{1}{3}$ by 72	$.12\frac{1}{2}$ by 48	$1.16\frac{2}{3}$ by 48
$.37\frac{1}{2}$ by 48	$.08\frac{1}{3}$ by 24	$1.37\frac{1}{2}$ by 24

1. I have a rug 2 yd. long and $1\frac{3}{8}$ yd. wide. How many square yards does it contain?

2. When $2\frac{1}{4}$ yd. of velvet are worth \$12, how much will 3 yd. be worth?

3. What per cent is gained by buying sirup at 80¢ a gallon, and selling it at 12¢ a pint?

4. A man gained \$28 on a watch, which was 25% of what it cost him. How much did it cost him?

5. How many rods of fence will inclose a field $\frac{3}{4}$ of a mile square?

Rapidly multiply :

$$.08\frac{1}{8} \times 48$$

$$.66\frac{2}{3} \times 33$$

$$2.25 \times 12$$

$$.33\frac{1}{3} \times 99$$

$$.75 \times 128$$

$$3.75 \times 12$$

$$.50 \times 186$$

$$.37\frac{1}{2} \times 8$$

$$2.12\frac{1}{2} \times 16$$

$$.06\frac{1}{4} \times 16$$

$$16\frac{2}{3} \times 6$$

$$1.50 \times 42$$

6. How many square yards are there in a strip of carpet 6 yd. long and 27 in. wide?

7. If $\frac{7}{8}$ of a load of hay is worth \$14, how much will 2 full loads be worth?

8. John lost $16\frac{2}{3}\%$ by selling his watch for \$10 less than it cost him. How much did it cost him?

9. If a merchant sells 1 bu. 1 pk. of clover seed for what $1\frac{1}{2}$ bu. cost him, what per cent does he gain?

10. My farm is $\frac{1}{2}$ a mile square. How many rods of fence does it take to inclose it?

Written.

1. At 84¢ a yard, how much will it cost to carpet a room 18 ft. by 20 ft. with carpet 27 in. wide, 6 in. being allowed for matching?

2. How many boards 12 ft. by 4 in. will be required for a room 48 ft. by 32 ft.?

3. How many days did a note run that was dated May 20, 1910, and paid Sept. 14, 1910?

4. The latitude of Montreal is $45^{\circ} 35'$ N. and of Richmond, Va. is $37^{\circ} 20'$ N. What is the distance in degrees, etc. between them?

5. How many rings, each weighing 7 pwt. 15 gr., can be made from a bar of gold weighing 7 pwt. 15 gr.?

6. How many yards of carpeting 30 in. wide will carpet a floor $16\frac{1}{2}$ ft. long and 15 ft. wide, and what will be the cost at \$1.30 a yard?

7. Find the cost of glazing 6 windows, each 8 ft. 3 in. by 5 ft. 4 in., at 75¢ a square foot.

8. A note dated Jan. 31, 1908 was paid June 30, 1908. How many days did it run?

9. The longitude of Albany is $73^{\circ} 44' 50''$ W. and of Berlin is $13^{\circ} 23' 45''$ E. What is the distance in degrees, etc. between them?

10. How many spoons, each weighing 2 oz. 15 pwt., can be made from 5 lb. 6 oz. of silver?

THIRD MONTH

RAPID DRILLS—daily.

THE FUNDAMENTAL OPERATIONS—to secure quickness and accuracy.

COMMON FRACTIONS—reviewed.

DECIMAL FRACTIONS—reviewed.

DENOMINATE NUMBERS. Reduction, addition, subtraction, multiplication, division.

MEASUREMENTS. Areas of surfaces, cost of carpeting, fencing, plastering, papering, areas of circles.

TABLES—reviewed.

BILLS—reviewed. Endorsement of checks, etc.

PERCENTAGE. Finding per cents of numbers. Finding what per cent one number is of another. Finding a number when a per cent of it is given. Finding a number when the number plus a certain per cent of it is given.

PROBLEMS. To cover the work of the month in common and decimal fractions and tables; also four of the type problems.

XLI

Oral.

Rapidly add :

560	280	640	480	390	420	780	750	630	690
<u>390</u>	<u>270</u>	<u>260</u>	<u>430</u>	<u>250</u>	<u>280</u>	<u>260</u>	<u>590</u>	<u>480</u>	<u>470</u>

1. How much does pork cost per hundredweight that is sold at a gain of 10 %, or of 55¢ per hundredweight?

2. What is the price of corn per bushel that is sold at a loss of 25 % of the cost, which is a loss of 18¢ a bushel?

3. What is the width of a room that is 25 ft. long when the floor contains 500 sq. ft.?

4. What is the width of a field that contains 2 A. or 320 sq. rd. and is 40 rd. long?

5. What is the length of another field that is 6 rd. wide and contains 3 A. ?

Tell how to find the area of a surface when you know the length and the width.

Tell how to find the length when you know the area and the width.

Tell how to find the width when you know the area and the length.

Rapidly add :

880	940	610	660	940	860	510	630	750	820	910
<u>220</u>	<u>380</u>	<u>390</u>	<u>560</u>	<u>290</u>	<u>650</u>	<u>220</u>	<u>380</u>	<u>290</u>	<u>560</u>	<u>550</u>

6. From a 10 lb. package of coffee there were sold $5\frac{1}{2}$ lb. How much was the remainder worth at 30¢ a pound?

7. If Albert spends $\frac{7}{12}$ of his day in work and study, how many hours are left for sleep and recreation?

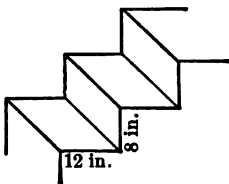
8. Ned bought a knife for 85¢ and a fountain pen for \$1; he sold them both for \$3. How much did he gain?

9. The area of a room is 25 sq. yd. and the width is 15 ft. What is the length?

10. What per cent of $\frac{5}{8}$ is $\frac{1}{4}$?

Written.

How much will it cost to carpet a stairway having 17 steps, each 12 in. wide, with rises of 8 in. between each step, at the rate of 90¢ a yard? *



* SOLUTION

12 in. + 8 in. = 20 in. carpet for 1 step.

$$\frac{\$.90}{1} \times \frac{20}{1} \times \frac{17}{1} \times \frac{1}{36} = \$ 8.50. \quad \text{Ans.}$$

1. At 90¢ a yard, what is the cost of carpeting a stairway of 17 steps, each 10 in. wide, the rises between steps being 8 in.?

2. At 64¢ a yard, how much will it cost to cover a flight of 18 steps, each 10 in. wide and $7\frac{1}{2}$ in. high?

3. The area of a field is 414 sq. ft., the width is 18 ft. What is the length?

4. The area of a room is 12 sq. yd., the width is 18 ft. What is the length?

5. A farmer exchanged 9 T. of hay worth \$15.50 a ton for wheat worth \$2.10 a bushel. How many bushels of wheat did he receive? _____

6. Add: 2345

4867

5324

8768

3922

7189

5842

7963

2487

9679

3456

7891

7. At 75¢ a yard, what is the cost of carpeting a stairway having 18 steps, each 20 in. wide, the rises between steps being 10 in.?

8. How much will it cost to carpet a room 51 ft. long by 33 ft. wide with carpet 27 in. wide, costing \$1.08 a yard?

9. The area of a field is 1248 sq. ft. and the length is 104 ft. Find the width of it.

10. If $\frac{5}{8}$ of a yard costs \$7 $\frac{1}{2}$, how many yards can be bought for \$94 $\frac{1}{2}$?

XLII

Oral.

Rapidly add :

$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$	$\frac{1}{3}, \frac{1}{6}, \frac{1}{2}$	$\frac{1}{4}, \frac{1}{8}, \frac{1}{2}$	$\frac{1}{2}, \frac{1}{5}, \frac{1}{10}$
$\frac{1}{2}, \frac{2}{3}, \frac{1}{4}$	$\frac{2}{3}, \frac{1}{6}, \frac{1}{2}$	$\frac{3}{4}, \frac{1}{8}, \frac{1}{2}$	$\frac{1}{2}, \frac{2}{5}, \frac{1}{10}$
$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}$	$\frac{2}{3}, \frac{5}{6}, \frac{1}{2}$	$\frac{3}{4}, \frac{3}{8}, \frac{1}{2}$	$\frac{1}{2}, \frac{2}{5}, \frac{3}{10}$

Give approximately the length and the width of the room in which you are. Give the approximate distance covered in walking the length and the width ; in walking all around the room.

What is the distance round a parallelogram called ?

What is the length of the perimeter of a square 9 ft. on a side ? of a rectangle 35 ft. long and 15 ft. wide ? of a parallelogram 70 ft. long and 18 ft. wide ?

If you know the perimeter of a room and the height of the walls, how can the square contents or the area of the four walls be determined ?

The perimeter of a room is 100 ft. and the walls are 9 ft. high. How many square feet are there in the surface of the four walls ? How many square yards are there in the surface of the four walls ?

1. How much will it cost to plaster a wall 12 ft. long and 9 ft. high at $12\frac{1}{2}$ ¢ a square yard ?

2. How many square yards are there in the four walls of a room 25 ft. long by 20 ft. wide and 10 ft. high ?

3. How much will it cost to cover a room 18 ft. by 15 ft. with linoleum $1\frac{1}{4}$ yd. wide, at \$1 a yard ?

4. Two quarts is what decimal part of 1 bu. ?

5. 7.5 is .03 of what number ?

Rapidly add :

$$\begin{array}{cccc}
 \frac{5}{8} \text{ and } \frac{1}{2} & \frac{7}{8} \text{ and } \frac{1}{2} & \frac{7}{12} \text{ and } \frac{5}{8} & \frac{9}{10} \text{ and } \frac{4}{5} \\
 \frac{5}{8} \text{ and } \frac{1}{4} & \frac{2}{3} \text{ and } \frac{5}{8} & \frac{2}{4} \text{ and } \frac{7}{8} & \frac{3}{4} \text{ and } \frac{5}{12} \\
 \frac{2}{3} \text{ and } \frac{2}{4} & \frac{5}{12} \text{ and } \frac{2}{4} & \frac{9}{10} \text{ and } \frac{1}{2} & \frac{15}{16} \text{ and } \frac{2}{8}
 \end{array}$$

Tell how to add fractions.

6. 8.4 is .04 of what number ?
7. Sixty grains Troy is what decimal part of an ounce ?
8. How many square yards are there in the surface of the four walls of a room 30 ft. long, 24 ft. wide, and 10 ft. high ?
9. How many square yards are there in the ceiling of a room 20 ft. by 18 ft. ?
10. 4.08 is .2 of what number ?

Written.

At 45¢ a square yard, how much will it cost to plaster the walls and ceiling of a room 25 ft. by 18 ft., 16½ ft. high, 324 sq. ft. being deducted for windows and doors ? *

* SUGGESTED FORM OF SOLUTION :

$$(25 \text{ ft.} + 18 \text{ ft.}) \times 2 = 86 \text{ ft. perimeter.}$$

$$86 \times 16\frac{1}{2} \text{ sq. ft.} = 1419 \text{ sq. ft. in 4 walls.}$$

$$25 \times 18 \text{ sq. ft.} = 450 \text{ sq. ft. in ceiling.}$$

$$\underline{1869 \text{ sq. ft., walls and ceiling.}}$$

$$\underline{324 \text{ sq. ft. to be deducted.}}$$

$$1545 \text{ sq. ft. to be plastered.}$$

$$\begin{array}{r}
 .15 \quad 515 \\
 \cancel{45} \times \cancel{1515} \times \frac{1}{2} = ? \\
 \hline
 1 \quad 2
 \end{array}$$

1. At 40¢ a square yard, find the cost of plastering a room 20 ft. by 18 ft. and 9 ft. high, $266\frac{1}{2}$ sq. ft. being allowed for windows and doors.

2. At 36¢ a square yard, how much will it cost to plaster a room 12 ft. square and 8 ft. high, 117 sq. ft. being deducted for windows and doors?

3. At 27¢ a square yard, how much will it cost to plaster a room 21 ft. 6 in. by 16 ft. and 9 ft. high, 225 sq. ft. being allowed for windows and doors?

4. At 36¢ a square yard, find the cost of plastering a room 40 ft. by $36\frac{1}{2}$ ft. and $22\frac{1}{4}$ ft. high, 1370 sq. ft. being deducted for windows and doors.

5. How many pounds (Troy) of gold are as heavy as 10 lb. (avoir.) of iron?

6. At 17¢ a square yard, how much will it cost to plaster a wall 32 ft. 8 in. long by 9 ft. high?

7. At $62\frac{1}{2}\text{¢}$ a square yard, find the cost of plastering a room 45 ft. by 30 ft. 6 in., 18 ft. 9 in. high, 219 sq. ft. being allowed for doors and windows.

8. How much will it cost to plaster a room 17 ft. by 13 ft. and 9 ft. high, at \$7.11 per square (100 sq. ft.)?

9. How many yards of plain carpet 2 ft. 4 in. wide will it take to cover a floor 52 ft. by 35 ft.?

10. From $.7\frac{1}{2}$ take $.345\frac{1}{2}$.

XLIII

Oral.

Rapidly add:

4.56	8.7	.75	4.53	.5	.603	3.52	2.25	3.46
<u>2.3</u>	<u>4.20</u>	<u>.328</u>	<u>1.87</u>	<u>.085</u>	<u>.85</u>	<u>1.758</u>	<u>1.87</u>	<u>1.54</u>

Tell how to add decimal fractions.

1. How many yards of carpet 27 in. wide will it take to carpet the floor of a room 18 ft. long by 12 ft. wide? In what way must the carpet be laid to have no waste?

2. Reduce $7\frac{2}{3}$ to a decimal fraction.

3. Change $.14\frac{2}{3}$ to a common fraction.

4. Find the sum of $\frac{2}{3}$ and .012.

5. What is the difference in value between $5\frac{1}{4}$ and .005?

Rapidly add:

3.27	.875	.94	4.75	8.63	.034	.304	42.3	48.5
<u>1.56</u>	<u>.28</u>	<u>.382</u>	<u>2.83</u>	<u>4.13</u>	<u>.019</u>	<u>.18</u>	<u>16.7</u>	<u>24.6</u>

6. Find the sum of $\frac{1}{3}$ and $.1\frac{1}{3}$.

7. Find the difference between $1\frac{1}{3}$ and .05.

8. How much will $\frac{2}{3}$ yd. and $\frac{1}{4}$ ft. of twine cost at 4¢ a foot?

9. One third of a pole stands in mud, $\frac{1}{4}$ in water, and the remaining 15 ft. in the air. What is the whole length of the pole?

10. What is meant by the greatest common divisor of two or more numbers? What is the g.c.d. of 18 and 24? of 15 and 45? of 20 and 30?

Written.

1. At 45¢ a square yard, find how much it will cost to plaster a room 36 ft. by $18\frac{1}{2}$ ft. and $12\frac{1}{2}$ ft. high, 219 sq. ft. being allowed for openings.

2. At \$1.80 a yard, how much will it cost to carpet a room 28 ft. 4 in. by 17 ft. 6 in. with carpet 30 in. wide, 6 in. being allowed on each strip except the first for waste in matching?

3. How many yards of lining $\frac{3}{8}$ yd. wide will it take to line goods 28 yd. by $\frac{4}{5}$ yd.?

4. How many yards of lining $\frac{4}{5}$ yd. wide will it take to line material $7\frac{3}{4}$ yd. by $1\frac{1}{4}$ yd.?

5. How many yards $\frac{3}{4}$ yd. wide shall I have to buy to line 2 sets of curtains, each set containing 12 yd. by $1\frac{1}{4}$ yd.?

6. At 36¢ a square yard, how much will it cost to plaster a room $27\frac{1}{2}$ ft. by 18 ft. and 12 ft. high, 325 sq. ft. being deducted for openings?

7. At 15¢ a square yard, find the cost of plastering a room $18\frac{1}{2}$ ft. by $14\frac{1}{2}$ ft. and $9\frac{3}{4}$ ft. high, if allowance is made for 4 windows each 6 ft. by $3\frac{1}{4}$ ft., 2 doors each $6\frac{3}{4}$ ft. by $2\frac{5}{8}$ ft., and a baseboard 9 in. in width.

8. What is the cost of carpeting a room 18 ft. 6 in. by 12 ft. 4 in. with carpet $\frac{3}{8}$ yd. wide, at 72¢ a yard?

9. What is the cost of lining goods $12\frac{1}{2}$ yd. by $1\frac{1}{2}$ yd. with lining $\frac{1}{2}$ yd. wide, at \$2 $\frac{1}{2}$ a yard?

10. How much will it cost to line 2 sets of curtains, each set containing 10 yd. by $\frac{1}{2}$ yd., with lining $\frac{3}{4}$ yd. wide, at 87 $\frac{1}{2}$ ¢ a yard?

XLIV

Oral.

Rapidly add :

bu.	pk.	bu.	pk.	gal.	qt.	gal.	qt.
$\frac{1}{2}$	0	7	2	$\frac{1}{4}$	0	9	1
3		4	8	3		8	2
<hr/>		<hr/>		<hr/>		<hr/>	
yd.	ft.	yd.	ft.	yd.	in.	yd.	in.
3	1	8	1	$\frac{1}{8}$	8	15	9
2	2	7	2	7		12	8
<hr/>		<hr/>		<hr/>		<hr/>	

1. I spent $\frac{1}{8}$ of an hour reading and $\frac{7}{10}$ of an hour writing. What part of the hour was left?
2. I sold a cow for \$30, which was $\frac{2}{3}$ of the amount it cost me. How much did it cost me?
3. What part of 48 ¢ is 40 ¢?
4. At 72 ¢ a gross, how much will 6 pencils cost?
5. If I bought a book for 28 ¢ and sold it for 21 ¢, what per cent loss did I have?

Rapidly add :

qt.	pt.	pt.	gi.	pk.	qt.	pk.	pt.
2	1	15	3	1	5	9	$1\frac{1}{2}$
4	1	8	2	2		7	$\frac{1}{2}$
<hr/>		<hr/>		<hr/>		<hr/>	
pwt.	gr.	oz.	pwt.	qt.	gi.	yd.	in.
6	4	8	10	8	2	8	15
6	8	5	8	9	1	4	5
<hr/>		<hr/>		<hr/>		<hr/>	

6. If a yard of cloth costs \$ $\frac{4}{5}$, how much will $\frac{3}{4}$ of a yard cost?

7. I sold a book for 96¢ that cost me 84¢. What per cent did I gain?

8. If $\frac{4}{5}$ of the value of a lot is \$120, what is the entire value?

9. How much will $\frac{5}{8}$ doz. pads cost at \$1.44 a gross?

10. I had 54¢ and spent 48¢. What per cent of my money had I left?

Written.

1. Add: 564.415

382.242

596.0872

87.342

5.67892

7.4836

5.2942

75.02

375.782

2. Mr. Harvey burned $12\frac{3}{4}$ T.

of coal in his furnace last winter,

$11\frac{1}{2}$ T. the winter before, $11\frac{1}{4}$

T. the winter before that, and

has bought $12\frac{3}{4}$ T. for the com-

ing winter. How many tons

of coal has he bought in all?

3. How much will a hogs-
head of wine cost at $6\frac{1}{4}$ ¢ a gill?

4. What will be the expense of paving a sidewalk 304 ft. by $7\frac{1}{2}$ ft., at \$2.25 a square yard?

5. How many yards of carpet 2 ft. 6 in. wide will cover a room 27 ft. 3 in. by 22 ft. 6 in.?

6. How much will 7 bu. 3 pk. 5 qt. cost at 15¢ a peck?

7. How much will it cost to slate a roof 64 ft. 9 in. by 48 ft., at \$15.12 $\frac{1}{2}$ a square?

8. From 14 lb. 5 oz. 3 pwt. 16 gr. take 7 lb. 6 oz.

9. Divide $27\frac{3}{4}$ by 6.03.

10. There were 75 pupils absent on a stormy day. If this was 15% of the whole number, how many pupils were there in the school?

XLV

Oral.

Rapidly subtract:

134	132	122	150	124	112	180	279	630	750	510
<u>75</u>	<u>94</u>	<u>56</u>	<u>83</u>	<u>89</u>	<u>56</u>	<u>89</u>	<u>154</u>	<u>380</u>	<u>290</u>	<u>220</u>

1. One fifth of a pole stands in mud, $\frac{1}{4}$ in water, and the remainder, 22 ft., in the air. What is the whole length of the pole?

2. I bought a knife for 25¢ and sold it for 35¢. What per cent did I gain?

3. At 20¢ a pint, how much will 30 qt. of ice cream cost?

4. How much will 5 quires of paper cost at \$1 a ream?

5. If it takes $\frac{3}{4}$ lb. of flour to make a loaf of bread, how many loaves can be made from 18 lb. of flour?

Rapidly subtract:

100	124	132	820	730	910	380	386	668	457	279
<u>61</u>	<u>35</u>	<u>38</u>	<u>560</u>	<u>440</u>	<u>550</u>	<u>290</u>	<u>263</u>	<u>325</u>	<u>237</u>	<u>125</u>

6. A man had 60 acres of land. How many acres had he left after selling $\frac{2}{3}$ of his land?

7. If 1 yd. 1 ft. of wire cost 20¢, how much must be paid for a yard?

8. A pole stands $\frac{1}{10}$ in mud, $\frac{1}{2}$ in water, and 21 ft. in the air. What is the length of the pole?

9. How much shall I have to pay for 5 pencils at \$2.88 a gross?

10. If $\frac{7}{8}$ of a certain number is 21, what is $\frac{5}{8}$ of the same number?

Written.

1. How much will it cost to plaster a room 40 ft. by 32 ft. 4 in., 15 ft. high, at 15¢ a square foot, 815 sq. ft. being allowed for doors and windows?
 2. How much will it cost to carpet a room 39 ft. by 18 ft. with carpet $\frac{3}{4}$ yd. wide, at 80¢ a yard?
 3. How much will it cost to line 2 sets of curtains, each curtain being 4 yd. by $1\frac{1}{2}$ yd., with lining 2 yd. wide, at \$1 $\frac{1}{2}$ a yard?
 4. At 72¢ per yard, how much will it cost to cover a stairway of 21 steps each 12 in. wide, the rises between steps being 10 in. high?
 5. A man traveled 127 mi. 120 rd. a day for 15 da. before his automobile broke down. How far did he lack of having traveled 2500 mi.?
-
6. How much will it cost to paint the walls, ceiling, and floor of a room 33 ft. by $22\frac{1}{2}$ ft., 8 ft. high, at 60¢ a square yard?
 7. How much will it cost to carpet a room 7 yd. by 5 yd. with carpet 24 in. wide, at \$1.25 a yard?
 8. How many yards of lining $\frac{4}{5}$ yd. wide will line goods 36 yd. by $\frac{7}{8}$ yd.?
 9. What is the width of a field 120 rd. long that contains 24 A.?
 10. I bought 2000 boards at \$27 per M and 975 at \$3.80 per C. How much did I pay for all?

XLVI**Oral.**

Rapidly subtract:

37.	2.01	1.	2.4	3.2	1.	1.	2.305	3.
<u>3.7</u>	<u>.62</u>	<u>.075</u>	<u>1.05</u>	<u>1.005</u>	<u>.057</u>	<u>.245</u>	<u>.27</u>	<u>.056</u>

Tell how to find the length of fence needed to inclose a field having straight sides, when the outside measurements of the field are known.

1. I have a rectangular field 30 rd. long and 20 rd. wide. How many feet of fence will be needed to inclose it?

2. I have a rectangular field 20 rd. long and 10 rd. wide. How many feet of fence will inclose it?

3. What is the area in square yards of a triangle that has a base of 20 ft. and an altitude of 18 ft.?

4. If I pay 36¢ for an article which I afterward sell for 40¢, what per cent do I gain?

5. 36 is $16\frac{2}{3}\%$ of what number?

Rapidly subtract:

4.	2.5	2.05	1.	1.5	1.8	2.75	3.87
<u>1.375</u>	<u>.75</u>	<u>.173</u>	<u>.075</u>	<u>.05</u>	<u>.005</u>	<u>.183</u>	<u>1.23</u>

6. At 20¢ a foot, how much will it cost to fence a field 10 rd. by 10 rd.?

7. My farm is $\frac{1}{2}$ mi. square. How many rods of fence does it take to inclose it?

8. A can do a piece of work in 4 da., and B in 5 da. How long does it take them, if they work together at these rates?

9. A pole stands $\frac{1}{3}$ in mud, $\frac{1}{4}$ in water, and 25 ft. in the air. How long is the pole?

10. In a mixed school, where the boys form $\frac{4}{7}$ of the whole number, there are 60 girls. How many pupils in all are there in the school? How many boys are there?

Written.

1. What is the cost of fencing a field 98 rd. by 65 rd. at 25¢ a foot? *

2. I own a piece of land 80 rd. by 40 rd. How much will it cost me to fence it at 75¢ a foot?

3. Find the cost of fencing a field 96 rd. by 50 rd. at 12 $\frac{1}{2}$ ¢ a foot.

4. How much will it cost to fence a field 100 rd. by 50 rd., 5 $\frac{1}{2}$ ft. high, at \$3 a square?

5. Find the cost of fencing a field 150 rd. by 150 rd. with a fence 7 ft. high, at 50¢ a square.

6. Mr. Brown has a field 150 rd. by 100 rd. which he wishes to inclose with a fence 6 ft. high. Find how much it will cost him at the rate of 33 $\frac{1}{3}$ ¢ a square.

7. My garden, 200 ft. by 180 ft., has a fence 5 $\frac{1}{2}$ ft. high. What is the cost of painting it at 10¢ a square foot?

8. My neighbor's garden is 300 ft. by 200 ft. and is inclosed with a fence 6 ft. high. How much will it cost him to have it painted at 25¢ a square yard?

9. A garden 200 ft. by 180 ft. has a fence 5 $\frac{1}{2}$ ft. high. What is the cost of painting it at 10¢ a square yard?

10. Divide .048 by 600,000.

* SUGGESTION: $3\frac{1}{3} \times [(98 + 65) \times 2] \times 16\frac{1}{2} = ?$

XLVII

Oral.

Rapidly subtract :

$$\begin{array}{r}
 \frac{7}{8} \quad \frac{11}{8} \quad \frac{11}{8} \quad \frac{9}{10} \quad \frac{7}{8} \quad \frac{7}{9} \quad \frac{16}{25} \quad \frac{2}{4} \quad \frac{7}{10} \quad 1\frac{1}{2} \quad 1\frac{1}{8} \quad 1\frac{1}{4} \quad 1\frac{1}{8} \quad 1\frac{1}{5} \quad 1\frac{1}{2} \\
 \hline
 1\frac{1}{2} \quad \frac{5}{6} \quad \frac{5}{4} \quad \frac{4}{5} \quad \frac{9}{16} \quad \frac{2}{3} \quad \frac{2}{5} \quad \frac{5}{8} \quad \frac{2}{5} \quad \frac{3}{4} \quad \frac{5}{6} \quad \frac{7}{8} \quad \frac{2}{3} \quad \frac{7}{10} \quad \frac{5}{8}
 \end{array}$$

1. A pole stands $\frac{1}{3}$ in the air and $\frac{1}{4}$ in the water; the remainder of the pole, 10 ft., is in the mud. What is the length of the pole?

2. If I sold an article for 12¢ and gained 2¢, what per cent did I gain?

3. How many days are there from July 15 to Sept. 12?

4. How much will 2 bu. 3 pk. cost at 5¢ a quart?

5. Seventy-five is $62\frac{1}{2}\%$ of what number?

Rapidly subtract :

$$\begin{array}{r}
 \frac{1}{7} \quad \frac{5}{16} \quad \frac{5}{8} \quad \frac{2}{16} \quad \frac{3}{4} \quad \frac{2}{4} \quad \frac{2}{25} \quad \frac{5}{8} \quad 1\frac{1}{2} \quad 2\frac{1}{2} \quad 5\frac{1}{8} \quad 6\frac{1}{4} \quad 4\frac{1}{8} \quad 6\frac{1}{5} \quad 5\frac{1}{2} \\
 \hline
 1\frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{32} \quad \frac{1}{32} \quad \frac{1}{14} \quad \frac{8}{8} \quad \frac{1}{5} \quad \frac{1}{2} \quad \frac{2}{14} \quad \frac{2}{4} \quad \frac{15}{16} \quad \frac{27}{8} \quad 1\frac{3}{8} \quad 3\frac{7}{10} \quad 2\frac{3}{8}
 \end{array}$$

6. What per cent of a mile is 40 rd.?

7. How many feet are there in $5\frac{2}{3}$ yd.?

8. What is the area of a triangle the base of which is 10 ft. and the altitude 4 ft.?

9. What is the length of a triangle, the altitude of which is 15 ft. and the area 30 sq. ft.?

10. A can do a piece of work in 6 da., and B in 5 da. How long will it take them, if they work together at these rates?

Written.

1. How much will it cost to wainscot a room 15 ft. by 18 ft. and 6 ft. high, at \$1.25 a square yard?
 2. How much will it cost to wainscot a room 21 ft. 8 in. by 14 ft. 10 in. and 10 ft. 6 in. high, at 30¢ a square yard?
 3. Find the cost of wainscoting a room 22½ ft. by 15 ft. 6 in. and 7½ ft. high, at 45¢ a square yard.
 4. Find the cost of painting the walls and ceiling of a room 16 ft. 6 in. long, 15 ft. 9 in. wide, and 14 ft. high, at 25¢ per square yard.
 5. What is the cost of paving a street 3 mi. 115 rd. long and 2 rd. wide at \$46.50 per square rod?
-
6. One side of a public park, square-shaped, is 660 ft. How many acres does it contain?
 7. How many acres are there in a rectangular field 36 rd. 12 ft. wide and 48 rd. 8 ft. long?
 8. How much will it cost to plaster a room 20 ft. by 15 ft. and 9½ ft. high, at \$10.25 a square?
 9. How much will it cost to paint the outside of a frame house 50 ft. by 28 ft. and 35 ft. high, at \$12.25 per square?
 10. What is the price of a ton, if 96,140 lb. cost \$67.29½?

XLVIII**Oral.**

Rapidly subtract:

ft.	in.	ft.	in.	gal.	qt.	qt.	pt.
13	0	14	11	5	3	3	0
3	5	5	10.75	8	2	2	1

Rapidly subtract:

ft.	in.	ft.	in.	gal.	qt.	qt.	pt.
5	8	8	3	8	2	6	1
3	9	5	7	7	3	3	2

1. A lady sold her horse and carriage for \$700 and by so doing lost \$100. What per cent did she lose?

2. If a boy can walk 6 mi. in 2 hr., how far at this rate can he walk in 40 min.?

3. At 4¢ a pint, find the cost of 3 gal. 3 qt. of milk.

4. If a bushel of peas costs \$1.28, how much does $\frac{3}{4}$ of a peck cost?

5. Find the cost of .5 of a gallon of olive oil when 1 doz. pints cost \$3.60.

Rapidly subtract:

bu.	pk.	bu.	qt.	bu.	pt.	pk.	qt.
15	3	14	5	20	14	8	5
11	2	12	9	10	6 $\frac{1}{2}$	2	7

pk.	pt.	qt.	pt.	gal.	qt.	gal.	pt.
6	2	5	0	7	3	17	5
3	8	2	1	5	4	12	7

6. How much silk, $\frac{3}{4}$ of a yard wide, will it take to line 10 $\frac{1}{2}$ yd. of velvet $\frac{1}{2}$ of a yard wide?

7. How many yards of carpet 1 yd. wide will cover a floor 15 ft. by 12 ft.?

8. How many square feet are there in the walls of a room 15 ft. by 12 ft. and 9 ft. high? How many square yards are there?

9. Fifty-six gal. 1 qt. of milk is put in equal quantities into 9 cans. How many gallons and quarts are there in each can?

10. If 1 can holds 5 gal. 3 gi. of milk, how much can be put into 8 similar cans?

Written.

1. How much will it cost to line a tank $5\frac{3}{4}$ ft. by 4 ft. and 5 ft. deep with zinc weighing 5 lb. to the square foot and costing 12¢ a pound? *

2. What will be the cost of lining a tank 7 ft. by $6\frac{1}{4}$ ft. and 5 ft. deep with zinc weighing 4 lb. to the square foot and costing 10¢ a pound?

3. How much will it cost to line a tank $7\frac{5}{12}$ ft. by $4\frac{1}{2}$ ft. and $6\frac{1}{4}$ ft. deep with zinc weighing 5 lb. to the square foot and costing 12¢ a pound?

4. How many bulbs will be required for a flower bed 12 ft. by 4 ft., if they are planted 6 in. apart? (Make a diagram. †)

5. How many bulbs 3 in. apart can be planted in a flower bed 16 ft. by 3 ft.?

6. How much will it cost to line a tank $7\frac{1}{2}$ ft. by 5 ft. and 4 ft. deep with zinc weighing 4 lb. to the square foot and costing $12\frac{1}{2}$ ¢ a pound?

7. What is the cost of lining a tank $7\frac{5}{12}$ ft. by $4\frac{1}{2}$ ft. and $4\frac{1}{4}$ ft. deep with zinc weighing 5 lb. to the square foot and costing 12¢ a pound?

* The four sides and bottom of the tank are lined.

† In all such examples the first bulb is as far from the edge of the flower bed as the distance between the bulbs.

8. How many bulbs can be planted 4 in. apart in a flower bed 12 ft. by 4 ft.?

9. How many plants can be planted 5 ft. apart in a flower bed 25 ft. by 35 ft.?

10. If .075 of an acre costs \$4½, how much will 1 A. cost?

XLIX

Oral.

Rapidly multiply:

410	310	420	630	740	830	990	650	490	370
<u>6</u>	<u>9</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>7</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>

1. Seven bushels of potatoes are divided equally among 8 persons. How many pecks and quarts does each receive?

2. How many feet and inches are there in $\frac{4}{3}$ of a yard?

3. How many yards of carpet a yard wide will be needed for the floor of a room 21 ft. long and 18 ft. wide?

4. Find the area in square feet of a triangle having a base of 20 yd. and a perpendicular height of 30 ft.

5. Eighty per cent of a class of 55 pupils is promoted. How many are not promoted?

Rapidly multiply:

240	220	180	120	180	160	130	110	750	630
<u>8</u>	<u>9</u>	<u>8</u>	<u>7</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>2</u>	<u>3</u>

6. How much will 1 bu. and 1 pk. of peanuts cost at 5¢ a quart?

7. How much will a grocer receive for a barrel (196 lb.) of flour, if he retails it at 3¢ a pound?

8. If a certain quantity of provisions will last one man 315 da., how long should it last 45 men?

9. 75 % of a class of 44 were promoted. How many were not promoted?

10. Twenty-five miles is 50 % of the distance between two cities. How far apart are the cities?

Written.

1. A farmer had 6 barns full of hay, each containing 9 T. 14 cwt. 56 lb., from which he sold 33 T. 18 cwt. 32 lb. How much had he left?

2. A grocer bought 24 lb. of grapes at $12\frac{1}{2}$ ¢ a pound. He sold them at 16¢ a pound. How much did he gain?

3. A man having a hogshead of wine sold $\frac{3}{4}$ of it. Find the remainder in gallons and quarts. (1 hogshead = 63 gal.)

4. I exchanged 12 cd. of wood worth \$8 a cord, and 1700 rails worth \$6 a C for a carriage worth \$200. How much did I gain or lose?

5. What part of 5 bu. is 3 bu. 2 pk. 1 pt.?

6. Reduce 5 lb. 8 oz. 16 pwt. 17 gr. to pounds and the decimal of a pound.

7. What is the value of a silver pitcher weighing 2 lb. 10 oz. (avoir.), at \$2.25 per ounce (Troy)?

8. A street 36 ft. wide was paved with Nicholson pavement at \$3.25 a square yard. How much would it cost to pave 32 rods in length?

9. How long will it take to pave a street 2 mi. long and 60 ft. wide, if 25 sq. yd. can be paved each day?

10. A tract of land 2 mi. square was divided equally into 40 farms. How much did each farm contain?

L

Oral.

Rapidly multiply :

.08	1.2	8.5	.12	.56	.005	1.3	2.4	3.5	1.5
.07	5	3	8	7	9	.5	.7	.05	.06
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

1. Twenty-five hundredths is .125 of what number?
2. If I sell goods that cost \$45 for \$55, what per cent of the cost do I gain?
3. At \$40 an acre, what is a farm $\frac{1}{2}$ mi. square worth?
4. How long must a lot be to contain .5 of an acre, if it is 4 rd. wide?
5. If a man walks .25 of a mile in 5 min., how many hours at that rate will it take him to walk 6 mi.?

Rapidly multiply :

\$2.25	\$4.75	\$6.20	\$9.40	\$5.50	\$6.80	\$5.25	\$2.50
20	8	25	15	16	20	16	12
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

6. A boy spent $\frac{2}{3}$ of his money and then found he had but \$3.60 left. How much money did he spend?
7. How many yards of oilcloth a yard wide are required to cover a floor 18 ft. by 27 ft.?
8. How many rods of fence are needed to fence both sides of a road 2 mi. long?
9. If hay is \$16 a ton, how much is 750 lb. worth?
10. If $2\frac{1}{2}$ yd. of muslin cost 34¢, how much do 10 yd. cost at the same rate?

Written.

1. How much does it cost to fence a field 90 rd. by 60 rd. at $12\frac{1}{2}$ ¢ a foot?
 2. A garden 100 ft. by 80 ft. has a fence $7\frac{1}{2}$ ft. high. How much does it cost to paint it at 25 ¢ a square foot?
 3. How much does it cost to wainscot a room 28 ft. by 15 ft. 4 in. and 4 ft. 3 in. high, at 45 ¢ a square yard?
 4. How much does it cost to line a tank $6\frac{1}{2}$ ft. by 5 ft. and 7 ft. deep, at 12 ¢ a pound, if an allowance is made of 4 lb. to the square foot?
 5. How many bulbs can be planted 5 ft. apart in a flower bed 25 ft. by 15 ft.?
-
6. How much will it cost to fence a field 87 rd. by 50 rd. at 25 ¢ a foot?
 7. What is the cost of wainscoting a room 15 ft. long by 14 ft. 3 in. wide, to a height of 6 ft., at 30 ¢ a square yard?
 8. At $12\frac{1}{2}$ ¢ a pound, how much will it cost to line a tank $8\frac{1}{2}$ ft. by 4 ft., 5 ft. deep, 4 lb. of zinc being allowed to the square foot?
 9. How many bulbs planted 6 in. apart will be required for a flower bed 12 ft. by 4 ft.?
 10. From 85 mi. 260 rd. 2 ft. 8 in. take 29 mi. 296 rd. 5 yd. 1 ft. 9 in.

LI

Oral.

Rapidly find the products :

$6 \times \frac{1}{2}$

$\frac{7}{15} \times 45$

$\frac{5}{8} \times \frac{1}{2}$

$1\frac{1}{2} \times \frac{2}{3}$

$4 \times 2\frac{3}{8}$

$5\frac{5}{8} \times 24$

$\frac{3}{8} \times \frac{3}{8}$

$\frac{5}{8} \times 2\frac{1}{2}$

$32 \times \frac{5}{8}$

$\frac{5}{18} \times 64$

$\frac{4}{5} \times \frac{7}{8}$

$1\frac{7}{8} \times \frac{3}{4}$

$35 \times 6\frac{3}{8}$

$1\frac{3}{7} \times 7$

$\frac{3}{8} \times 1\frac{5}{7}$

$\frac{3}{8} \times 4\frac{1}{2}$

Draw a circle and divide it into two equal parts. What is the line called that bounds the circle? What is the line called that divides the circle into two equal parts? What is one half of that line called? Make a string exactly the length of the diameter; then find, by measuring, how many times the diameter is contained in the circumference.

Draw another circle larger or smaller than the one just drawn, and draw its diameter. Measure the length of this diameter, and see how many times it is contained in the circumference of the circle. Draw another circle and find how many times the diameter, the circumference is.

The circumference of a circle is approximately how many times its diameter?* What is the length of the diameter of a circle having a radius of 4 ft.?

The diameter of a circle is 6 ft. What is the length of its radius?

The diameter of a circle is 14 ft. What is the circumference?

1. What is the circumference of a circle having a diameter of 7 ft.? of 21 ft.?

* $3\frac{1}{2}$ (or 3.1416) times the diameter. (Use $3\frac{1}{2}$ in the examples, unless otherwise directed.)

2. Find the diameter of a circle having a circumference of 22 ft. ; of 11 ft.

3. What is the circumference of a circle having a radius of $4\frac{1}{2}$ ft.? of $10\frac{1}{2}$ ft.?

4. What is the radius of a circle having a circumference of 22 ft.? of 11 ft.?

5. Find the area of a rectangle having a base of 15 in. and an altitude of 7 in. What is the area of a triangle formed by drawing one diameter of this rectangle?

Rapidly multiply :

$15 \times \frac{3}{8}$	$\frac{5}{8} \times 24$	$\frac{5}{8} \times \frac{3}{4}$	$2\frac{3}{4} \times \frac{3}{8}$
$20 \times 1\frac{3}{4}$	$1\frac{3}{8} \times 48$	$\frac{3}{8} \times \frac{3}{4}$	$\frac{4}{5} \times 2\frac{5}{8}$
$12 \times \frac{3}{8}$	$\frac{7}{12} \times 72$	$\frac{3}{4} \times \frac{7}{8}$	$1\frac{1}{2} \times \frac{8}{15}$
$16 \times 2\frac{1}{4}$	$2\frac{3}{4} \times 16$	$\frac{4}{5} \times \frac{15}{8}$	$\frac{7}{8} \times 4\frac{1}{2}$

If the radius of a circle is known, how is the diameter determined? If the diameter of a circle is known, how is the radius determined? If the diameter of a circle is known, how is the circumference determined? If the circumference of a circle is known, how is the diameter determined? the radius?

6. The radius of a circle is 14 ft. How long is the diameter? the circumference?

7. The circumference of a circle is 44 ft. How long is the diameter? the radius?

8. 3 bu. of oats will sow an acre. How much will it cost to sow 8 A., if the seed costs 50¢ a bushel?

9. A boy bought $\frac{1}{2}$ bu. of chestnuts for \$1.25 and sold them at 10¢ a quart. How much did he make?

10. Three fourths of a peck of oats is what part of a bushel?

Written.

1. Find the circumference of a circle having a diameter of 6 ft.
 2. The diameter of a circle is $12\frac{1}{2}$ ft. How long is the circumference?
 3. The circumference of the planet Venus is about 7800 mi. What is the approximate length of its diameter?
 4. Find the diameter of a circle having a circumference of 500 ft.
 5. In 1900 the population of New York State was 7,268,894 and in 1910 it was 9,113,279. What per cent of increase was there from 1900 to 1910?
-
6. Find the diameter of a circle having a circumference of $325\frac{1}{2}$ ft.
 7. The distance around a circular pond is 600 ft. What is the distance across the center?
 8. The diameter of a circle is 105 ft. How long is its circumference?
 9. How many iron rails, each 16 ft. long, are required to lay a track 26 mi. long?
 10. In 1900 the population of a certain city was 790,391 and by 1910 it had increased to 1,657,155. What was the per cent of increase?

LII**Oral.**

Rapidly find the results:

$$\frac{36 \times 14}{9}$$

$$\frac{37 \times 16}{2}$$

$$\frac{67 \times 36}{18}$$

$$\frac{83 \times 36}{12}$$

Rapidly find the results:

$$\frac{32 \times 82}{41}$$

$$\frac{15 \times 48}{16}$$

$$\frac{25 \times 18}{36}$$

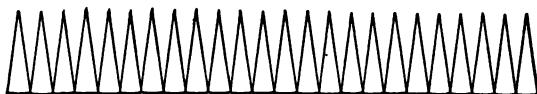
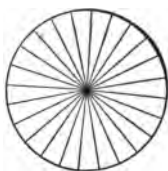
$$\frac{4 \times 46}{23}$$

$$\frac{32 \times 67}{96}$$

$$\frac{33 \times 12}{99}$$

$$\frac{89 \times 13}{26}$$

$$\frac{44 \times 17}{34}$$



Cut a piece of paper in the form of a circle. Divide it into minute triangles by drawing a number of radii. Open the circle by cutting it at one point in the circumference and along the line of each radius. What do these figures represent? Tell how to find the area of a triangle. If a circle consists of a number of triangles, having portions of the circumference for a base and the radius for altitude, tell how to find the area of a circle.

$$\text{Area} = \frac{\text{Cir.} \times \text{rad.}}{2} \text{ or } \frac{\text{Cir.} \times \text{diam.}}{4}.$$

Draw a circle. Draw two diameters perpendicular to each other. Draw a square on each of the radii thus formed. As part of each square falls outside the circle, notice that less than four of these squares would cover the entire surface or area of the circle, or about $3\frac{1}{4}$ squares.*

Find the area of a circle having a radius of 3 ft.; a diameter of 4 ft.

* The area of a circle is 3.1416 (or $3\frac{1}{4}$) times the square of the radius.

1. The diameter of a circle is 4 ft. Find the radius of the circle. Find the area of the square on the radius. Find the area of the circle.

2. The diameter of a circle is 2 ft. Find the area of the circle.

3. How much will it cost to pave a rectangular court 40 ft. long and 30 ft. wide, at \$1.50 per square foot?

4. What must be the length of a piece of cloth which is $\frac{2}{3}$ of a yard wide and which contains 26 sq. yd.?

5. A man had a farm consisting of $6\frac{1}{2}$ A. He sold 2.015 A. How much had he left?

Rapidly find the results :

$$\frac{25 \times 8}{50}$$

$$\frac{6 \times 6}{4}$$

$$\frac{20 \times 9}{15}$$

$$\frac{28 \times 32}{14}$$

$$\frac{45 \times 21}{9}$$

$$\frac{12 \times 8}{48}$$

$$\frac{56 \times 8}{7}$$

$$\frac{27 \times 33}{9}$$

$$\frac{16 \times 9}{64}$$

$$\frac{64 \times 8}{16}$$

$$\frac{27 \times 24}{8}$$

$$\frac{12 \times 6}{9}$$

6. Find the area of a circle whose radius is 3 ft.

7. Find the area of a circle whose diameter is 4 ft.

8. Find $\frac{1}{2}$ of .008.

9. The dividend is .08 and the divisor 40. Find the quotient.

10. Henry lost 20¢, which was $\frac{4}{5}$ of the amount he had at first, and $\frac{1}{2}$ of the amount his sister had. How much had Henry at first, and how much had his sister?

Written.

1. The radius of a circle is $10\frac{1}{2}$ ft. Find the area of the circle.
 2. The radius of a circle is 42 ft. Find the area of the circle.
 3. What is the area of a circle having a diameter of 70 ft.?
 4. A cow is fastened to a stake with a chain. If the chain is 40 ft. long, over what space can the cow graze?
 5. From the sum of 61 gal. 3 qt. 1 pt. and 36 gal. 1 pt. take 28 gal. 2 qt. and divide the result by 18.
-
6. The diameter of the base of a cylindrical tank is 42 ft. Find the area of the base.
 7. The circumference of the top of a cylindrical barrel is 2.4 ft. What is the area of its base?
 8. The circumference of a circular park is 100 ft. What is the area?
 9. If 9 lb. of quinine are bought for \$12.25 per pound and sold for \$16.50 per pound, what per cent is gained?
 10. A dealer paid \$368 $\frac{1}{2}$ for a horse and sold it for $\frac{3}{4}$ of the cost. How much was lost?

LIII**Oral.**

Rapidly multiply:

yd.	ft.	ft.	in.	da.	hr.	hr.	min.
3	2	2	10	1	3	3	40
	8		8		10		10
<hr/>		<hr/>		<hr/>		<hr/>	

gal.	qt.	qt.	pt.	ft.	in.	ft.	in.
3	2	3	1	14	5	9	7
	5		6		7		6

I have a room which is 6 yd. long and 4 yd. wide. How many yards is it around the room? How many half yards? How many strips of wall paper, standard size (that is, 8 yd. long, 18 in. wide), will it take to cover the walls? If the room is 8 ft. high, how many strips can be cut from a roll? How many rolls of paper will be needed, no allowance being made for windows and doors?

Measure the distance around your classroom in yards, and double the number of yards for the number of strips of paper needed in papering it. Then divide the number of strips required for the room by the number of strips that can be cut from each roll. (This will depend upon the height of the room, and a part of a roll must be considered a whole roll.) The quotient will be the number of rolls required, if no allowance is made for openings.

1. What is the distance in yards around a room which is 18 ft. by 15 ft. and 7 ft. 6 in. high?

2. How many half yards are there in a room of the same dimensions as Example 1? How many strips of paper will be required for the walls?

3. If walls are 7 ft. 6 in. high, how many full strips can be cut for these walls from a roll of paper?

4. If the room requires 44 full strips and you can cut 3 full strips from each roll, how many rolls of paper must you buy to paper the room mentioned in Example 1?

5. At \$1.75 per pair, how much will 32 pr. of gloves cost?

Rapidly multiply :

ft.	in.	yd.	ft.	gal.	qt.	bu.	pk.
8	7	9	2	7	3	9	2
	5		8		6		7
<hr/>							
pk.	qt.	dr.	sc.	pwt.	gr.	qt.	pt.
6	5	5	2	8	3	4	1
	8		10		7		9
<hr/>							

6. The product of two numbers is 8.64; one of the numbers is 2. What is the other number?

7. A farmer having 24 cows sells $\frac{3}{4}$ of the number at \$50 each. How much does he receive for them?

8. A merchant ships 250 suits to a customer, which is $\frac{5}{8}$ of his usual number. How many suits has he usually shipped to that customer?

9. How much shall I have to pay for the fringe for a tablecloth 3 yd. wide by 5 yd. long at 25¢ a yard?

10. At the rate of $\frac{5}{8}$ of a yard of ribbon for 20¢, how much will 3 yd. cost?

Written.

How many rolls of paper will cover the walls of a room 18 ft. by 15 ft. and 8 ft. high? *

1. How much will the paper cost, at 15¢ a roll, to paper the walls of a room 16 ft. by 14 ft. and 8 ft. high, if 2 rolls are deducted for doors and windows?

*SUGGESTED METHOD: $(18 \text{ ft.} + 15 \text{ ft.}) \times 2 + 8 \text{ ft.} = 22$, number of yd.;
44 = number of strips.

24 ft. + 8 ft. = 8, number of strips from each roll.

44 strips ÷ 8 strips = 15, number of rolls of paper. *Ans.*

2. How much will the paper cost at 18¢ a roll, for the walls of a room 21 ft. by 17 ft. and 10 ft. high, if 3 rolls are deducted for doors and windows?

3. How much will the paper cost, at 50¢ per roll, for the walls of a parlor 16 ft. by 12 ft. and 9 ft. 3 in. high, if 2 strips are deducted for each of two windows and 3 strips for the door?

4. How much will it cost to cover a floor 18 ft. 6 in. long and 14 ft. 9 in. wide with carpet 1 yd. wide, worth 85¢ a yard, if the strips run lengthwise and $\frac{1}{8}$ of a yard is allowed on every strip except the first for matching?

5. How much will it cost to pave a sidewalk 70 ft. long and $7\frac{3}{4}$ ft. wide, at \$2.12 $\frac{1}{2}$ per square yard?

6. At 20¢ a roll, how much will the paper cost for the walls of a room 20 ft. long, 18 ft. wide, and 11 ft. high, 4 rolls being deducted for doors and windows?

7. At 45¢ a roll for walls and 50¢ for ceiling, find the cost of paper for the walls and ceiling of a room 15 ft. long, 12 ft. wide, and 9 ft. high, 5 strips being deducted for doors and windows.

8. At 50¢ per roll, how much will it cost to paper the walls of a room 30 ft. long, 20 ft. wide, and 10 ft. high, 5 strips being allowed for doors, windows, etc.?

9. How much will it cost to paint the outside of a house, the entire surface of which is 20 ft. by 150 ft., at 18¢ per square yard?

10. How many plants 3 ft. apart can be planted in a bed 12 ft. square?

LIV

Oral.

Rapidly divide:

$$\begin{array}{ccccc}
 6\overline{)426} & 25\overline{)625} & 7\overline{)245} & 12\overline{)1728} & 8\overline{)1624} \\
 20\overline{)480} & 30\overline{)563} & 5\overline{)485} & 8\overline{)2808} & 9\overline{)1827}
 \end{array}$$

1. Mr. Barton bought 10 cows for \$200, and sold 8 of them for what they all cost. Find the gain per cent.
2. I bought 6 yd. of calico for \$1.80, and sold it at a gain of 10 %. How much was gained on each yard?
3. Henry spent 20 % of \$50 for a watch and 20 % of the remainder for a chain. How much had he remaining?
4. Multiply 200 by $.5\frac{1}{2}$.
5. What number taken from $25\frac{1}{2}$ will leave $7\frac{3}{4}$?

Rapidly divide:

$$\begin{array}{ccccc}
 4\overline{)568} & 7\overline{)812} & 8\overline{)368} & 6\overline{)4212} & 12\overline{)6024} \\
 40\overline{)245} & 20\overline{)305} & 50\overline{)2552} & 7\overline{)4214} & 9\overline{)6818}
 \end{array}$$

6. A man paid \$150 for a horse and sold it at a gain of 10 %. How much did he gain, and for how much did he sell it?
7. If 9 men can do a piece of work in $4\frac{1}{2}$ da., how long will it take 6 men to do it, working at the same rate?
8. A pole is 30 ft. above ground, and its length above ground is $\frac{2}{3}$ of $\frac{1}{2}$ of the length of the whole pole. How long is the pole?
9. If 7 peaches cost 8¢, how much will 21 peaches cost at the same rate?
10. Eighteen is $\frac{3}{4}$ of how many times 8?

Written.

1. How much will it cost to paper the walls and ceiling of a room 36 ft. by 24 ft. and 18 ft. high, with paper $1\frac{1}{2}$ ft. wide, at \$1.50 a roll, if an allowance of 64 sq. yd. (16 rolls) is made for doors and windows?

2. How many rolls will paper the walls of a room 18 ft. by $16\frac{1}{2}$ ft. and 8 ft. from the baseboard to the ceiling, no allowance being made for windows and doors?

3. How many rods of fencing are required to inclose a square lot each side of which is $234\frac{1}{4}$ ft. long?

4. How much will it cost to fence a field 96 rd. by 64 rd. at $33\frac{1}{8}$ ¢ a foot?

5. What is the cost of lining a tank $7\frac{1}{2}$ ft. by $4\frac{3}{8}$ ft. and 5 ft. deep, at $12\frac{1}{2}$ ¢ a pound, 6 lb. being allowed to the square foot?

6. At 36¢ a roll, how much will it cost to paper the walls of a hall $16\frac{1}{2}$ ft. by 6 ft. and 7 ft. between baseboard and ceiling, after deducting four strips for a door and a window?

7. At \$1.25 a yard, how much will it cost to carpet a room 18 ft. by 14 ft., no allowance being made for matching, and the carpet being $\frac{3}{4}$ yd. wide?

8. How much will it cost to wainscot a room 16 ft. 6 in. long, 17 ft. wide, and 5 ft. high, at 25¢ a square yard?

9. At 12¢ a pound how much will it cost to line a tank 8 ft. long, $7\frac{1}{2}$ ft. wide, and 6 ft. deep, if an allowance is made of 5 lb. to the square foot, at 12¢ a pound?

10. The latitude of New York is $40^{\circ} 24' 40''$ N. and of St. Augustine is $29^{\circ} 48' 30''$ N. How far apart are they, in degrees, seconds, and minutes?

Oral.

LV

Rapidly divide:

$$\begin{array}{r} 4 \overline{)4.68} \quad 25 \overline{)4.00} \quad 4 \overline{)1.82} \quad 11 \overline{)1.43} \quad 12 \overline{)1.272} \\ 7 \overline{)8.47} \quad 6 \overline{)1.272} \quad .5 \overline{).375} \quad .04 \overline{)81.2} \quad .8 \overline{)56.8} \end{array}$$

1. Seven eighths of a yard of ribbon is used to wrap a Christmas box, including $\frac{1}{4}$ of a yard for tying the knot. What is the distance around the box?

2. If I sell tea at 30¢ a pound that cost me 45¢ a pound, what per cent do I lose?

3. If 3.5 T. of coal cost \$35, how much coal can be bought for \$25?

4. I have a lot that measures 8 rd. by 16.5 ft. long. What per cent of an acre is it?

5. A boy sold a sled for \$2.40, which was 60% of its cost. How much did it cost? How much did he lose?

Rapidly divide:

$$\begin{array}{r} 50 \overline{)3.25} \quad .4 \overline{).648} \quad 04 \overline{)24.8} \quad 60 \overline{)4.8} \quad .6 \overline{)4.806} \\ .7 \overline{)6.307} \quad 40 \overline{)16.32} \quad 12 \overline{)3.648} \quad 1.2 \overline{)24.12} \quad .07 \overline{)21.07} \end{array}$$

6. If a man earns \$90 a month and spends \$72 for necessary expenses, what per cent of his earnings has he left?

7. What per cent of 4 gal. is 1.6 pt.?

8. A boy earned \$15, which was 20% of what he had before. How much has he now?

9. How many hours are there in 25% of a day?

10. How much corn at \$ $\frac{3}{8}$ a bushel can be had for \$1.20?

Written.

1. At 45¢ a roll, how much will it cost to paper the walls of a room 27 ft. by 18 ft. and 8 ft. from baseboard to ceiling, 3 rolls being allowed for openings?

2. What is the area of a circle having a circumference of 132 ft.?

3. Find the circumference of a circle having a diameter of 72 ft.

4. If a room is 20 ft. square and 10 ft. high, how much will it cost to paint the walls and ceiling at 60¢ a square yard?

5. How many bulbs can be planted 6 in. apart in a bed 12 ft. by 14 ft. ? _____

6. How much will it cost, at 50¢ a square yard, to plaster a room 25 ft. by 18 ft., 9½ ft. high, with a baseboard around the room 18 in. high, 4 rolls being allowed for doors and windows?

7. I have a circular flower bed 50 ft. in circumference. What is its area in square feet?

8. A millwright was told to make a water wheel 19½ ft. in diameter. How long was its circumference?

9. A note dated May 21, 1911, was paid Nov. 28, 1911. How many days did it run?

10. How many yards of silk, $\frac{7}{8}$ yd. wide, will line 18 yd. of velvet $\frac{1}{2}$ yd. wide?

LVI**Oral.**

Rapidly divide:

$$\begin{array}{cccccccc} \frac{3}{8} \div 4 & \frac{9}{10} \div 2 & 4\frac{1}{2} \div 4 & 4\frac{1}{5} \div 3 & \frac{3}{4} \div \frac{2}{5} & \frac{3}{4} \div \frac{7}{8} & 2\frac{1}{2} \div \frac{5}{8} & \frac{3}{4} \div 2\frac{3}{4} \\ \frac{1}{9} \div 5 & \frac{4}{5} \div 5 & 8\frac{1}{2} \div 2 & 5\frac{1}{5} \div 2 & \frac{3}{4} \div \frac{3}{5} & \frac{4}{5} \div \frac{8}{9} & 4\frac{1}{5} \div \frac{7}{9} & \frac{1}{5} \div 5\frac{1}{2} \end{array}$$

Describe different ways of sending money. Describe different ways of paying money. What is a check? State an advantage of sending money by check. What is the person called to whom the check is made payable? Who signs a check? Why and by whom is a check indorsed? How is a check indorsed?

SUGGESTION: Pupils can get a few blank checks from the nearest banks, and make them out payable to the order of their classmates. The payee can then indorse the check.

1. Using to-day's date, draw a check for \$40 on The School Bank to the order of James Clarke.

2. Find the diameter of a circle having a circumference of 88 ft. What is the ratio of the circumference of a circle to the diameter? (Give the ratio exactly and also approximately.)

3. A boy does $\frac{1}{4}$ of a piece of work one day, and $33\frac{1}{3}\%$ of the remainder the next day. What per cent of the remainder is left to be done?

4. A man owns a house worth \$2000. He insures it for 60% of its value. Find for how much he insures it.

5. If 1 qt. of nuts costs 11¢, how many bushels can I buy for \$35.20?

Rapidly divide:

$10 \div 6\frac{2}{3}$	$\frac{5}{8} \div 20$	$\frac{2}{4} \div \frac{3}{8}$	$2\frac{1}{2} \div 7\frac{1}{2}$
$20 \div 1\frac{1}{4}$	$\frac{4}{7} \div 16$	$\frac{5}{9} \div \frac{10}{18}$	$6\frac{2}{3} \div \frac{5}{9}$
$21 \div 1\frac{1}{2}$	$\frac{2}{4} \div 29$	$\frac{4}{8} \div \frac{10}{16}$	$7\frac{1}{2} \div \frac{5}{8}$
$10 \div \frac{2}{3}$	$\frac{7}{8} \div 21$	$\frac{3}{8} \div \frac{7}{8}$	$3\frac{1}{2} \div \frac{2}{10}$

6. If $1\frac{1}{2}$ lb. of tea costs 60¢, how much will $2\frac{1}{2}$ lb. cost? (Analyze this.)

7. After spending $\frac{1}{4}$ of his money, and then $\frac{1}{4}$ of the remainder, a boy has 18¢ left. How much had he at first?

8. If 75 % of a number is 36, what is the number?

9. What is the percentage of absence in a class that has 27 pupils present out of a register of 45?

10. What is 1 % of 160 rd.? What is $\frac{1}{2}$ % of 160 rd.? $\frac{1}{2}$ % of \$720? $\frac{1}{3}$ % of 360 ft.?

Written.

1. A man deposited \$2500 in a bank. He drew out by check the following amounts: \$14.62, \$280, \$157.85, \$350, \$87.50. How much had he left? Write the checks.

2. Mr. Henry N. Sanborn, New York City, bought of George C. Smith, 25 yd. velveteen @ \$1.85, 18 $\frac{3}{4}$ yd. satin @ \$3.75, 22 yd. cashmere @ \$1.63, 7 yd. velvet @ \$4.25. Make out a bill showing debtor and creditor, and receipt the bill.

3. Mr. John Tompkins bought goods amounting to \$360.75 from Mr. Henry Clay. Write a receipt. Write a check for the amount.

4. Mr. Jones rents a house from Mr. Scott, agreeing to pay \$50 a month. Write a receipt for 6 months' rent, and for 3 months' rent.

5. A dealer paid \$25 for a barrel of turpentine containing 41 $\frac{1}{4}$ gal., and sold it at 3¢ a gill. How much did he gain?

6. Write a check in payment of the following bill: 1 $\frac{1}{2}$ lb. nuts @ 20¢, 2 lb. raisins @ 25¢, 3 qt. cranberries @ 9¢, an 8-lb. turkey @ 28¢.

7. Your mother sent you to the grocery store for the following articles: 2 lb. tea @ 60¢, 7 lb. sugar @ $3\frac{1}{2}$ lb. for 19¢, 3 lb. butter @ 27¢, 2 doz. eggs @ 30¢. You had them charged to her account. At the end of the month what was the bill for these goods? Write out the check for them in your mother's name. Write a receipt for the money in the name of the grocer.

8. Five gallons, two quarts, one pint of currant jelly were put into half-pint jars costing 5¢ each, and were sold when filled at $12\frac{1}{2}$ ¢ per jar. How much money was left after paying for the jars?

9. A fountain measures $201\frac{1}{4}$ ft. in circumference. What area does it cover?

10. How many days did a note run which was dated Sept. 18, 1911, and was paid Jan. 15, 1912?

LVII

Oral.

Rapidly divide:

yd.	ft.	ft.	in.	da.	hr.	hr.	min.
4) <u>3</u>	3	8) <u>2</u>	8	10) <u>1</u>	6	10) <u>2</u>	40

bu.	pk.	pk.	qt.	gal.	qt.	bu.	pk.
4) <u>8</u>	2	4) <u>14</u>	2	5) <u>6</u>	1	6) <u>8</u>	2

1. A can do a piece of work in 6 da. and B in 4 da. How long will it take them working together at these rates?

2. A and B can build a wall in 6 da. A alone can do it in 9 da. How long would it take B alone to do it?

3. If a family uses 3 pt. of milk a day, what will be the milk bill for the quarter ending Nov. 30, if milk is 8¢ a quart?

4. A farm is valued at \$3000, which is $2\frac{1}{2}$ times the value of the house. How much is the house worth?

5. I pay 60¢ for some apples at the rate of 2 for 3¢, and sell them for 2¢ apiece. How much do I gain?

Rapidly divide:

bu.	pk.	gal.	qt.	pk.	qt.	gal.	pt.
2)8	3	3)4	1	4)7	4	5)16	2

bu.	qt.	yd.	ft.	yd.	in.	qt.	pt.
6)7	4	8)12	1	7)8	6	7)12	1

6. How many times will an $8\frac{1}{2}$ gal. can of oil fill a lamp that holds $\frac{2}{3}$ pt.?

7. I paid \$1.60 per bushel for peanuts, and sold them at 5¢ per $\frac{1}{2}$ pint. How much did I gain on a peck?

8. How many yards of carpeting, 1 yd. wide, will cover a floor 20 ft. long and 21 ft. wide?

9. How much will 20 rings cost at \$5.65 each?

10. A farmer having 75 sheep sold $66\frac{2}{3}\%$ of them. How many did he keep?

Written.

1. Add: \$ 837.50
 2361.25
 749.60
 3000.75
 568.92
 37.00
 650.28
 928.38
 1725.75
 67.44
 8396.87
 460.00
 28.38

2. The population of North Carolina in 1900 was 1893840. In 1910 there was an increase of $16\frac{1}{2}\%$ over 1900. What was the population in 1910?

3. How long should it require 20 men to do a piece of work if 12 men can do it in 15 da.?

4. If a field of 45 A. yields 40 bu. 3 pk. 5 qt. of wheat to the acre, how much does the entire field yield?

5. A dealer bought 8 chairs at \$10.75 each and sold them at a profit of 15%. How much did he gain?

6. Add: 875 $\frac{1}{4}$
 324 $\frac{1}{2}$
 29 $\frac{3}{8}$
 32 $\frac{7}{8}$
 456 $\frac{3}{4}$
 48 $\frac{1}{4}$
 786 $\frac{5}{12}$

7. A man made into rings 1 lb. 10 oz. 15 pwt. of gold, which cost him \$16 per ounce. Each ring weighed 3 pwt. 12 gr. He sold them at \$3.25 each. How much did he gain?

8. What per cent will be gained by selling 4 yd. of cloth for the cost of 6 yd., if the cost is \$1.75 a yard?

9. A grocer bought 10 bbl. of cider at \$2 a barrel. After converting it into vinegar he sold it all at 5¢ a quart. What was his whole gain?

10. What is the value of a farm 208.7 rd. long and 120 rd. wide, at \$81 $\frac{1}{4}$ an acre?

LVIII

Oral.

Rapidly give the per cent equivalents of:

$\frac{1}{2}$; $\frac{3}{8}$; $\frac{3}{4}$; $1\frac{1}{2}$; $2\frac{1}{2}$; $1\frac{1}{4}$; $3\frac{1}{4}$; $\frac{1}{40}$; $\frac{8}{40}$; $\frac{1}{200}$; $\frac{1}{300}$; $\frac{1}{500}$;
 $\frac{1}{8}$; $\frac{1}{7}$; $\frac{2}{7}$; $\frac{1}{12}$; $\frac{1}{16}$; $\frac{1}{400}$; $1\frac{3}{8}$; $2\frac{1}{8}$.

If 15 is 125 % of a number, what fractional part of the number is 15? If 15 is 25 % more than a certain number, what fractional part of the number is 15? Find the number.

1. Eighteen is $\frac{1}{8}$ more than a number. Find the number. (Analyze this.)
2. Twenty-four is 50 % of a certain number. Find the number.
3. Twenty-four is 50 % more than a certain number. What per cent of the number is 24? Find the number.
4. What number increased by $\frac{2}{3}$ of itself will equal 30?
5. What number increased by $16\frac{2}{3}$ % of itself will equal 42?

Rapidly give the per cent equivalents of:

$\frac{1}{8}$; $\frac{1}{4}$; $\frac{1}{6}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$; $1\frac{1}{8}$; $2\frac{1}{8}$; $3\frac{1}{8}$; $\frac{1}{800}$; $\frac{2}{800}$; $\frac{3}{800}$;
 $\frac{1}{500}$; $\frac{1}{12}$; $1\frac{1}{12}$; $1\frac{1}{18}$; $3\frac{1}{8}$; $\frac{7}{8}$; $\frac{5}{7}$; $\frac{7}{7}$.

6. What number increased by $\frac{2}{3}$ of itself is 24?
7. My salary this year is \$75 per month, or 25 % more than last year. What was my salary last year?
8. A farmer sold 1800 lb. of wool, which was $12\frac{1}{2}$ % more than he sold the previous year. How many pounds did he sell the previous year?

9. Twenty-eight is $33\frac{1}{3}\%$ more than what number?
10. A regiment of 800 men lost 160 men in battle. What per cent of the regiment remained?

Written.

1. A clerk's salary was increased 25 %. He then received \$2500 a year. What was his salary before the increase? *

2. I paid \$3000 for an automobile, which was 60 % more than I paid for a horse and carriage. How much did the horse and carriage cost?

3. I sold my farm for \$19,305, which was 32 % more than it cost me. How much did it cost me?

4. A man owned 65 % of the stock of a manufacturing company, and sold 40 % of his share for \$7800. How much was the company worth?

5. A man owning $\frac{3}{4}$ of a machine shop worth \$10,000, sold $16\frac{2}{3}\%$ of his share to his brother. What part did he still own? What was the value of the part he still owned?

6. A farmer sold 7.5 A. of land, which was 15 % of all he owned. How many acres did he own at first?

7. After a clerk's salary had been increased 12 %, he received \$1680. How much did he receive before the increase?

8. A man owning $\frac{3}{8}$ of a vessel, sold 35 % of his share for \$5600. At that rate, what was the value of the vessel?

* SUGGESTION: Original salary = 100 % of itself, or $\frac{4}{4}$ of itself

Increase = 25 % of itself, or $\frac{1}{4}$ of itself

Present salary \$2500 = ? % of itself, or $\frac{?}{4}$ of itself

9. A horse was sold for \$212.80, which was 12 % more than it cost. Find the cost.

10. A grocer having 37 lb. 9 oz. of pepper, sold 7 lb. 8 oz. of it. What per cent of it did he sell?

LIX

Oral.

Rapidly give the fractional equivalents of:

50 %; $\frac{1}{2}$ %; 25 %; $\frac{1}{4}$ %; $1\frac{1}{2}$ %; $1\frac{1}{4}$ %; $16\frac{2}{3}$ %; $33\frac{1}{3}$ %; $66\frac{2}{3}$ %; $14\frac{2}{3}$ %; $83\frac{1}{3}$ %; $12\frac{1}{2}$ %; $\frac{3}{4}$ %; $\frac{1}{8}$ %; $16\frac{2}{3}$ %.

1. A pupil failed on 3 out of 12 problems on an examination. What decimal part of his examination was incorrect?

2. The sixth grade had an attendance of 48, which was 20 % larger than the fifth grade attendance. How many pupils were in the fifth grade?

3. I bought 4 gal. of wine at \$1 a pint, and sold it at a gain of $12\frac{1}{2}$ %. How much did I gain? For how much a gallon did I sell the wine?

4. I had 1 pk. of corn and I sold 3 qt. What per cent had I left?

5. A clerk spent \$1200 a year, or $66\frac{2}{3}$ % of his salary. How much was his salary?

Rapidly give the fractional equivalents of:

32 %; 16 %; 61 %; 57 %; $37\frac{1}{2}$ %; $62\frac{1}{2}$ %; $1\frac{1}{8}$ %; $1\frac{1}{6}$ %; $6\frac{1}{4}$ %; $8\frac{1}{8}$ %; $2\frac{1}{2}$ %; $5\frac{1}{4}$ %; 42 %; 36 %; $87\frac{1}{2}$ %.

6. How much will $66\frac{2}{3}$ % of 1 gal. 1 pt. cost at 10 ¢ a pint?

7. What per cent of 1 gal. is 1 pt. ?
8. A man drew from the bank \$250, or 25% of his deposit. How much was his deposit ?
9. A man sells his horse for \$54, which is $12\frac{1}{2}\%$ more than he receives for a cow. Find the price of the cow.
10. I pay \$18 per week for board this year, which is 20% more than I paid last year. How much did I pay last year ?

Written.

1. The number of pupils in a certain school last year was 352. This year the school has increased $12\frac{1}{2}\%$. How many pupils are now in school ?
 2. In 1912 the population of a certain town was 44,160, the rate of increase during the year having been 20%. Find the population in 1911.
 3. I had \$3500. I spent 15% for board, 25% for clothes, and 30% for other expenses. How much had I left ?
 4. What number increased by 25% of itself equals 525 ?
 5. How many square yards are there in the walls and ceiling of a room 21 ft. by 18 ft. by 12 ft. ?
-
6. A land agent bought 1016 A. of land and sold $12\frac{1}{2}\%$ of it to one man and $37\frac{1}{2}\%$ of the remainder to another. How many acres had he remaining ?
 7. Divide .084 by 25.2.
 8. Five eighths is how many per cent of $\frac{1}{4}$?
 9. What number plus 20% of itself equals 768 ?
 10. If \$425 was 25% more than the cost of a span of horses, how much did they cost ?

LX**Oral.**

Rapidly find :

6 % of 50	$37\frac{1}{2}$ % of 16	80 % of 20	$37\frac{1}{2}$ % of 64
$12\frac{1}{2}$ % of 40	$83\frac{1}{3}$ % of 24	$87\frac{1}{2}$ % of 48	25 % of 400
$33\frac{1}{3}$ % of 60	$66\frac{2}{3}$ % of 72	$87\frac{1}{2}$ % of 40	$33\frac{1}{3}$ % of 18

1. How many days are there between March 12 and April 15, 1910?

2. Mr. Jameson sold his watch for \$70, which was 40 % more than it cost him. Find the cost.

3. I sold an article for 8¢, and by so doing lost 2¢. What per cent of the cost was my loss?

4. At 3¢ a pint, how much do I pay for 3 gal. 2 qt. of milk?

5. A boy's age increased by $\frac{7}{8}$ of itself equaled 39 yr. How old was he?

 Rapidly find :

$12\frac{1}{2}$ % of 80	$66\frac{2}{3}$ % of 57	$187\frac{1}{2}$ % of 40	$14\frac{2}{3}$ % of 49
$83\frac{1}{3}$ % of 36	$83\frac{1}{3}$ % of 24	$133\frac{1}{3}$ % of 24	$16\frac{2}{3}$ % of 48
$16\frac{2}{3}$ % of 36	$87\frac{1}{2}$ % of 16	$66\frac{2}{3}$ % of 84	$62\frac{1}{2}$ % of 24

6. If a town of 1500 people gained 20 % in ten years, find the population at the end of the ten years.

7. A teacher whose salary is \$2400, spends \$2000 annually. What per cent of his salary does he save?

8. While a ship was leaking, the skipper threw overboard 800 bbl. of flour, which was $16\frac{2}{3}$ % of its cargo. How many barrels of flour were in the cargo?

9. What number is that which being increased by $\frac{1}{10}$ of itself will equal 42?

10. I sold my watch for \$60, which was 20% more than it cost me. How much did it cost me?

Written.

1. At 50¢ a roll, how much will it cost to paper the walls of a room 30 ft. by $22\frac{1}{2}$ ft. and 10 ft. 8 in. high, including a molding around the top of the walls at 6¢ a foot?

2. Mrs. James Best of 242 Fifth Avenue, New York, bought from Hilton & Co. 15 yd. of China silk @ 65¢, 7 yd. of cloth @ 50¢, 6 yd. of blue serge @ 80¢, 2 hats at 67¢, 2 capes @ \$14.75. Write a check for the amount.

3. What per cent of $\frac{3}{8}$ is $\frac{2}{3}$?

4. A man rents a store at \$650 per annum, which is 13% of the value of the property. What is its value?

5. What number increased by 32% of itself equals 198?

6. How much will the paper cost at 35¢ a roll, to paper the walls of a room 24 ft. long, 15 ft. wide, and 10 ft. high, 3 rolls being deducted for doors and windows?

7. I bought 4 lb. of tea @ 50¢, 3 lb. of coffee @ 40¢, 5 lb. of crackers @ 25¢, and 25 lb. of oatmeal @ 5¢. Make out a check for the amount payable to your grocer.

8. What per cent of 1 bu. is 1 pt.?

9. A merchant bought a store for \$11,560, which is $62\frac{1}{2}$ % of what he sold it for. How much did he receive for it?

10. What number plus 15% of itself equals 1748?

FOURTH MONTH

RAPID DRILLS — daily.

THE FUNDAMENTAL OPERATIONS — to secure quickness and accuracy.

COMMON FRACTIONS — reviewed.

DECIMAL FRACTIONS — reviewed.

DENOMINATE NUMBERS. Reduction, addition, subtraction, multiplication, division.

MEASUREMENTS. Linear measure, square measure, cubic measure, board measure.

TABLES — reviewed. Contents of bins and tanks in bushels and gallons.

BILLS — reviewed.

PERCENTAGE. Finding per cents of numbers. Finding what per cent one number is of another. Finding a number when a per cent of it is given. Finding a number when the number plus or minus a certain per cent of it is given.

PROBLEMS. To cover the work of the month in common and decimal fractions and tables; also four of the type problems.

LXI

Oral.

Rapidly find :

What per cent

18 is of 24 20 is of 25 $\frac{1}{2}$ is of $\frac{1}{4}$ $\frac{1}{3}$ is of $\frac{1}{2}$ $2\frac{1}{2}$ is of $\frac{5}{8}$
 $\frac{5}{8}$ is of $2\frac{1}{2}$ $\frac{1}{4}$ is of $\frac{1}{2}$ $\frac{1}{3}$ is of $\frac{1}{4}$ $\frac{1}{4}$ is of $\frac{1}{3}$ $2\frac{1}{2}$ is of 5

What per cent

Of 48 is 12 Of 46 is 24 Of 72 is 36 Of $\frac{2}{3}$ is $\frac{1}{2}$ Of $\frac{3}{8}$ is $\frac{1}{4}$
Of $2\frac{1}{2}$ is $1\frac{1}{4}$ Of 6 is $1\frac{1}{2}$ Of 4 is $2\frac{1}{2}$ Of $\frac{1}{2}$ is $\frac{1}{3}$ Of $\frac{1}{3}$ is $\frac{1}{6}$

How many square feet are there in a blackboard that is 3 ft. long and 1 ft. high?

A block of marble is 6 ft. long, 4 ft. wide, and 1 ft. thick. How many cubic feet does it contain? If it were 2 ft. thick, how many cubic feet would it contain?

What is the measure of length called? the measure of surface? the measure of contents?

How many inches equal a foot? How many square inches equal a square foot? How many cubic inches equal a cubic foot?

1. How many square inches are there in the surface of a 6-inch cube? How many cubic inches are there in the contents of a 6-inch cube?

2. How many cubic feet are there in a box 4 ft. long, 3 ft. wide, and $1\frac{1}{2}$ ft. deep?

3. How many cubic feet of air are there in a room 12 ft. long, 10 ft. wide, and 9 ft. high?

4. What is the difference in cubic inches between the contents of a 6-inch cube and one of 6 cu. in.?

5. How many cubic feet are there in a piece of marble 6 ft. long, 4 ft. wide, and 3 ft. high?

Rapidly answer:

48 is what per cent of 96? of 144? of 200? of 500?

24 is what per cent of 84? of 36? of 200? of 480?

6. What is the difference in square feet between a space 3 feet square and a space of 3 square feet? (Make diagram.)

7. What is the difference in cubic feet between the contents of a 3 foot cube and 3 cubic feet?

8. How many cubic inches are there in the contents of a box 4 in. by 2 in. by 3 in.?

9. What is the solid contents of a piece of marble that measures 20 in. by 8 in. by 3 in.?

10. How many square yards are there in the floor of a room 20 ft. by 18 ft.?

Written.

1. How many cubic feet are there in a mound 54 ft. long, 36 ft. wide, and 12 ft. high?

2. How many cubic inches are there in a block of marble 6 ft. by 4 ft. by $2\frac{1}{2}$ ft.?

3. How many cubic yards are there in a room 18 ft. long, 14 ft. wide, and 10 ft. high?

4. How many cubic yards of earth must be removed in digging a cellar 36 ft. by 24 ft. by $6\frac{1}{2}$ ft.?

5. A milkman bought 40 gal. of milk a day at $4\frac{1}{2}$ ¢ a quart. After losing $\frac{1}{8}$ of it through spilling, he sold the remainder at 10¢ a quart. How much did he gain or lose?

6. How many cubic yards of earth must be removed in digging a reservoir 45 ft. long, 36 ft. wide, and $6\frac{1}{2}$ ft. deep?

7. How many loads of earth (27 cu. ft.) must be removed in digging a cellar 27 ft. long, 18 ft. wide, and 6 ft. deep?

8. How much will it cost to dig a cellar 45 ft. by 28 ft. by $8\frac{1}{2}$ ft. at 42¢ a load (or cubic yard)?

9. At 56¢ a cubic yard, find the cost of removing an embankment 240 ft. long, 38 ft. wide, and 8.5 ft. high.

10. Two men working the same number of days earned \$78 $\frac{1}{2}$. One received \$2 $\frac{1}{4}$ a day and the other \$3 $\frac{1}{2}$ a day. How many days did they work?

LXII

Oral.

Rapidly answer:

24 is 50% of what number? 25%? $33\frac{1}{3}\%$? $66\frac{2}{3}\%$?
60%? 75%? 40%? 20%?

36 is 25% of what number? 50%? $66\frac{2}{3}\%$? $33\frac{1}{3}\%$?
40%? 60%? 80%? $44\frac{4}{5}\%$?

1. How many cubic yards are there in the contents of a box 9 ft. by 3 ft. by 2 ft.?

2. How many cubic inches are there in a brick 8 in. long, 4 in. wide, and 2 in. thick?

3. How many cubic feet are there in a room 15 ft. long, 14 ft. wide, and 9 ft. high?

4. What is the length of the circumference of a circle having a radius of $3\frac{1}{2}$ ft.?

5. The base of a triangle is 12 yd. and the altitude 8 yd. Find the area of the triangle.

Rapidly answer:

8 is 50% of what number? 16 is 25% of what number?
30 is $12\frac{1}{2}\%$ of what number? 6 is 3% of what number?

102 is $16\frac{2}{3}\%$ of what number? 70 is 35% of what number?
16 is $33\frac{1}{3}\%$ of what number? 16 is $66\frac{2}{3}\%$ of what number?

6. A cistern 20 ft. long and 15 ft. wide is full of water. How many cubic feet of water must be drawn off to lower the surface of the water 7 ft.?

7. A cellar measures 8 yd. by 10 yd. by 3 yd. How many cubic yards does it contain?

8. How many square yards of carpet are there in a piece 36 yd. long and $\frac{3}{4}$ yd. wide?

9. How much will it cost to paint a ceiling 24 ft. long and 18 ft. wide, at 10¢ a square yard?

10. How many strips of carpet 27 in. wide will be needed for a room 18 ft. wide?

Written.

1. A pile of bricks containing 125 cu. yd. is $13\frac{1}{2}$ ft. wide and $8\frac{1}{2}$ ft. high. What is the length of the pile? *

2. A cistern 9 ft. square contains 405 cu. ft. What is its depth?

3. What is the length of a reservoir that is 24 ft. wide and 8 ft. deep and contains 5760 cu. ft.?

4. To what depth is it necessary to dig a cellar in a lot 30 ft. long and 20 ft. wide, in order to remove 50 cu. yd. of earth?

5. An automobile ran a distance of 918 mi. in 18 da. What was the average rate of speed per day?

6. How much will it cost to dig a cellar 45 ft. long, 28 ft. wide, and 14 ft. deep, at 80¢ a cubic yard for digging and 60¢ a load (cubic yard) for loading?

7. What must be the height of a schoolroom that is 20 ft. long and 16 ft. wide, to allow 140 cu. ft. of air to each of 42 pupils?

8. How many cubic feet of asphalt are required to cover a surface 2 yd. wide and 500 ft. long with a layer 3 in. thick?

* SUGGESTION: Use the cancellation method. $\frac{125}{1} \times \frac{27}{1} + (13\frac{1}{2} \times 8\frac{1}{2}) = ?$

9. From 6 yr. 10 mo. 2 wk. 5 da. 16 hr. take 3 yr. 10 mo. 3 wk. 2 da. 20 hr.

10. A grocer bought grapes at $12\frac{1}{2}$ ¢ a pound (avoir.) and retailed them at $16\frac{1}{2}$ ¢ a pound. What per cent did he gain?

LXIII

Oral.

Rapidly find the number of which

25 is $\frac{5}{8}$	36 is $\frac{4}{5}$	24 is $\frac{3}{4}$	56 is $\frac{7}{8}$
28 is $116\frac{2}{3}\%$	20 is 125%	16 is $133\frac{1}{3}\%$	15 is 120%

What is the standard length of a cord of wood? What is the width? What is the height?

If a cord of wood is 8 ft. long, 4 ft. wide, and 4 ft. high, how many cubic feet does it contain? If there are 128 cu. ft. in every cord of wood, tell how to calculate the number of cords of wood in any pile.

1. How many cords of wood are there in a pile 8 ft. long, 8 ft. wide, and 4 ft. high?

2. How much would the wood in a pile like that in the preceding example be worth at \$2.50 a cord?

3. A can make a bookcase in 6 days and A and B can make it in 4 days. At this rate, in what time can B make it alone?

4. Thomas sold his watch for \$25, which was 25% more than it cost him. How much did it cost him?

5. Three fifths of 15% is what per cent of 72%?

Rapidly find the number of which

15 is 150%	30 is 120%	40 is 125%	42 is 120%
15 is 125%	30 is 125%	40 is $114\frac{2}{3}\%$	42 is $116\frac{2}{3}\%$

6. A dog was bought for \$15, and sold at a gain of 20 %. For how much was it sold ?

7. By selling a hat for \$4 a dealer lost 20 %. What was the value of the hat ?

8. A man sold a cow for \$25, with a profit of $\frac{1}{5}$ of this amount. How much would he have gained per cent, if he had sold it for \$35 ?

9. A merchant buys $\frac{1}{4}$ doz. handsaws, at \$20 a dozen. At what price must he sell them to gain 50 ¢ apiece ?

10. What part of \$16 is $\$ \frac{1}{4}$?

Written :

1. How many cords of wood are there in a pile 28 ft. by 10 ft. by 10 ft. ?

2. How many cords of wood are there in a pile 30 ft. by 8 ft. by $6\frac{1}{2}$ ft. ?

3. At $\$3\frac{3}{4}$ a cord how much will a pile of wood $12\frac{1}{2}$ ft. by 8 ft. by $4\frac{1}{2}$ ft. cost ?

4. At $\$3\frac{1}{2}$ a cord what is the value of wood that can be piled under a shed 50 ft. by 25 ft. by 12 ft. ?

5. How many boxes 8 in. by 6 in. by 3 in. can be packed in a packing box 36 in. by 20 in. by 15 in. ?

6. How many cords of wood can be piled in a shed 64 ft. long, 28 ft. wide, and 20 ft. high ?

7. At \$4.25 a cord, how much will a pile of wood 26 ft. long, 4 ft. wide, and 4 ft. high cost ?

8. At \$4.25 a cord, and \$1 a load for hauling, find the cost of a pile of wood 240 ft. long, 24 ft. wide, and 6 ft. high. (Count $2\frac{1}{4}$ cd. to a load.)

9. How many acres are there in a square field each side of which is 120 rd.?

10. A and B contract to do a piece of work. A does $\frac{7}{15}$ and B $\frac{8}{15}$. B receives \$25 more than A. How much does each receive?

LXIV

Oral.

Rapidly reduce to whole or mixed numbers:

$\frac{25}{8}$; $\frac{36}{5}$; $\frac{87}{9}$; $\frac{22}{4}$; $\frac{56}{7}$; $\frac{64}{4}$; $\frac{32}{3}$; $\frac{74}{9}$; $\frac{32}{12}$; $\frac{64}{11}$; $\frac{45}{13}$; $\frac{37}{18}$; $\frac{87}{13}$.

1. If $\frac{3}{4}$ of the value of a ship is \$15,000, what is the whole value?

2. Five twelfths of 84 equals $\frac{7}{8}$ of what number?

3. At the rate of 3 apples for 5¢, how many apples can be bought for 20¢?

4. A farmer having 75 sheep, sold $66\frac{2}{3}\%$ of them. How many did he keep?

5. What per cent of $1\frac{1}{2}$ is $\frac{1}{2}$?

Rapidly reduce to whole or mixed numbers:

$\frac{72}{4}$; $\frac{88}{8}$; $\frac{23}{5}$; $\frac{67}{8}$; $\frac{42}{7}$; $\frac{22}{5}$; $\frac{24}{15}$; $\frac{87}{13}$; $\frac{35}{13}$; $\frac{45}{11}$; $\frac{38}{12}$; $\frac{34}{13}$; $\frac{56}{13}$.

6. At 35¢ a dozen, how much will 3 oranges cost?

7. Three sixteenths of 48 equals $\frac{3}{4}$ of what number?

8. What is 1% of \$600? $\frac{1}{2}\%$ of \$600? $\frac{1}{4}\%$ of \$600?

9. An agent collected a debt of \$240. He received $\frac{1}{8}\%$ commission. How much was his commission?

10. What per cent of $\frac{4}{5}$ is $\frac{1}{2}$?

Written.

1. A pile of wood contains $67\frac{1}{2}$ cd. It is 90 ft. long and 12 ft. wide. Find its height.
 2. Find the length of a pile of wood that is $5\frac{1}{2}$ ft. wide and 3 ft. high, and contains a cord.
 3. How many perch of stone ($24\frac{3}{4}$ cu. ft. = 1 perch of stone or masonry) are there in a wall 20 ft. long, 6 ft. high, and 3 ft. thick?
 4. How many perches of masonry are there in a wall 120 ft. long, $6\frac{3}{4}$ ft. high, and 18 in. thick?
 5. In building a house 200 beams were used, each 10 in. wide and 3 in. thick, amounting to 1000 cu. ft. Find the length of each beam.
-
6. Find the height of a load of wood 6 ft. long and 4 ft. wide containing a cord.
 7. How many perches of stone will build a wall 240 ft. long, 8 ft. 9 in. high, and $2\frac{1}{4}$ ft. thick?
 8. What is the value of a pile of tan bark 60 ft. long, 24 ft. wide, and 12 ft. high, at \$2 a cord?
 9. How much will it cost to carpet a room 24 ft. long and 18 ft. wide, with carpet $\frac{3}{4}$ yd. wide, at \$1 $\frac{1}{2}$ a yard?
 10. Find the cost of 1 lb. 9 oz. 17 pwt. 12 gr. of silver, at 60¢ an ounce.

LXV**Oral.**

Rapidly reduce to improper fractions :

$2\frac{1}{4}$; $4\frac{1}{8}$; $6\frac{1}{2}$; $7\frac{2}{3}$; $8\frac{2}{3}$; $9\frac{1}{4}$; $5\frac{5}{12}$; $7\frac{8}{9}$; $6\frac{5}{8}$; $20\frac{1}{2}$; $35\frac{1}{4}$;
 $56\frac{1}{8}$; $18\frac{2}{3}$; $15\frac{1}{4}$; $17\frac{1}{8}$; $19\frac{1}{2}$; $27\frac{2}{3}$; $35\frac{2}{3}$; $26\frac{1}{4}$; $42\frac{1}{6}$; $20\frac{1}{8}$.

1. What per cent is gained by buying molasses at 25¢ a gallon and selling it at 5¢ a pint?

2. I burned 15 gal. of kerosene oil, or 25 % of my supply, in 3 months. How much had I at first?

3. A tailor sold a coat at a profit of \$3, and gained 30 %. How much did it cost him?

4. At \$1.20 a bushel for plums, what part of a bushel can I buy for 75¢?

5. How many yards of oilcloth 4 ft. wide are required to cover a room 16 ft. long and 12 ft. wide?

Rapidly reduce to improper fractions:

$3\frac{1}{2}$; $5\frac{1}{3}$; $7\frac{2}{3}$; $6\frac{5}{8}$; $9\frac{1}{5}$; $7\frac{7}{12}$; $9\frac{1}{11}$; $20\frac{1}{4}$; $50\frac{1}{8}$; $27\frac{3}{4}$;
 $14\frac{1}{5}$; $25\frac{1}{3}$; $27\frac{1}{2}$; $15\frac{2}{3}$; $24\frac{1}{4}$; $18\frac{3}{4}$; $19\frac{2}{3}$; $17\frac{3}{4}$; $14\frac{2}{5}$; $13\frac{1}{4}$.

6. How many square rods are there in $\frac{3}{8}$ of an acre?

7. What is the price of a bushel of beans at the rate of 1 pk. 3 qt. for \$1.10?

8. If a boy steps 2 ft. at a time, how many steps will he take in going a distance of 2 rd. 1 yd.?

9. If I buy tea at 80¢ a pound and sell it for \$1.20 a pound, what per cent do I make?

10. A man sold a wagon for \$60 which was $\frac{4}{5}$ of the original cost. How much did he lose?

Written.

1. If a piece of timber is 9 in. wide and 6 in. thick, what length of it will be required to make 3 cu. ft.?

2. At 20¢ a cubic yard, how much will it cost to dig a cellar 32 ft. long, 24 ft. wide, and 6 ft. deep?

3. How many perches of stone will build a wall 60 ft. long, $16\frac{1}{2}$ ft. high, and 18 in. thick?

4. If a load of wood is 12 ft. long and 3 ft. 6 in. wide, how high must it be to contain a cord?

5. What is the value of a pile of wood 4 ft. in height, 6 ft. in length, and $3\frac{1}{2}$ ft. in width at \$4.50 a cord?

6. How many cords of wood will fill a woodshed 8 ft. high measuring on the inside, 24 ft. in length, and 16 ft. in width?

7. How many loads will be required to remove the earth from a cellar 32 ft. long, 25 ft. wide, and $5\frac{1}{2}$ ft. deep?

8. At \$3.50 a cord, what is the value of a range of wood 4 ft. wide, 64 ft. long, and 7 ft. high?

9. At $37\frac{1}{2}$ ¢ a load, how much will it cost to dig a cellar 36 ft. long, 24 ft. wide, and $5\frac{1}{2}$ ft. deep?

10. How much will it cost, at 5¢ a square foot, to paint two boxes, each side of one being 3 ft. square, and each side of the other being 3 sq. ft.?

LXVI

Oral.

Rapidly reduce to lowest terms :

$\frac{12}{18}$; $\frac{9}{27}$; $\frac{8}{16}$; $\frac{10}{200}$; $\frac{5}{100}$; $\frac{65}{100}$; $\frac{25}{38}$; $\frac{18}{38}$; $\frac{200}{1000}$; $\frac{12}{18}$.

How many cubic inches are there in a cubic foot? How are cubic feet changed to cubic inches? How many cubic inches are there in a bushel? How are cubic inches changed to bushels? (Multiply the number of cubic feet

in a bin by 1728 and divide the product by 2150.4 to find the exact number of bushels the bin will hold. $\frac{1728}{2150.4}$, the result obtained by multiplying both numbers by 10, has 384 for the greatest common divisor. Dividing the terms of the fraction by 384 will give $\frac{4\frac{1}{2}}{5\frac{1}{2}}$, which is approximately $\frac{4}{5}$. Therefore, to find the approximate number of bushels in a bin, the dimensions of which are given in feet, we may use $\frac{4}{5}$ as a multiplier.)

1. Tell how to find the exact number of bushels of wheat that can be put into a bin 8 ft. long, 6 ft. wide, and 4 ft. deep.

2. Tell how to find the approximate number of bushels of corn that can be put into a bin 12 ft. long, 7 ft. wide, and 5 ft. deep.

3. How many hours are there from 4 A.M. to 4 P.M.? from 3.15 A.M. to 4.30 P.M.?

4. John lost $\frac{1}{4}$ of his money and had 96¢ left. How much had he at first?

5. How many times is $\frac{4}{5}$ contained in $2\frac{3}{5}$?

Rapidly reduce to lowest terms:

$\frac{30}{800}$; $\frac{48}{72}$; $\frac{12}{36}$; $\frac{12}{36}$; $\frac{22}{78}$; $\frac{45}{80}$; $\frac{28}{34}$; $\frac{32}{44}$; $\frac{32}{48}$; $\frac{16}{80}$; $\frac{42}{56}$.

6. Mr. Jonas sold a lot for \$675, thereby losing \$85. How much did he pay for it?

7. If $2\frac{3}{4}$ yd. of calico cost 22¢, how many yards can be bought for 66¢?

8. How much will 3500 bricks cost at \$6 per M?

9. How many sheep, worth \$5 each, should be given in exchange for 12 horses worth \$200 each?

10. Divide 6 by .03.

Written.

1. A bin 6 ft. long, 5 ft. wide, and 4 ft. deep will hold how many bushels? *

2. A bin 20 ft. long, 12 ft. wide, and 5 ft. deep is full of wheat. How much is the wheat worth at \$2 a bushel?

3. A bin 7 ft. long, 6 ft. wide, and 5 ft. deep is $\frac{3}{4}$ full of rye. How much is the rye worth at \$1.60 a bushel?

4. Find the approximate number of bushels of grain that can be stored in an elevator bin 7 ft. square and 80 ft. high.

5. A grocer bought 3 boxes of soap, each containing 75 lb. at 6¢ a pound. He kept it until it had dried away in weight $\frac{1}{3}$, and then sold it at 9¢ a pound. How much did he gain or lose?

6. A bin measuring 4 ft. by $6\frac{1}{2}$ ft. by $3\frac{1}{2}$ ft. is filled with oats. How many bushels does it contain? How many times can a horse be fed 4 qt. of oats from the contents of the bin?

7. How many bushels of grain (approximately) does a bin hold that is $12\frac{1}{2}$ ft. long, $8\frac{3}{4}$ ft. wide, and 4 ft. deep?

8. How many perches of stone are there in a concrete dam 350 ft. long, 22 ft. wide, and 36 ft. high?

* SUGGESTION: $\frac{6}{1} \times \frac{5}{1} \times \frac{4}{1} \times \frac{1728}{1} \times \frac{1}{2150.4} = ?$

or

$$\frac{6}{1} \times \frac{5}{1} \times \frac{4}{1} \times \frac{4}{5} = ?$$

9. From 5 mi. 11 rd. 4 ft. take 2 mi. 4 rd. 9 ft.
 10. Reduce to its simplest form :

$$\frac{\frac{1}{2} \text{ of } 1\frac{1}{4} \times 4\frac{1}{2}}{\frac{5}{6} \times 1\frac{1}{2} \times 3\frac{1}{2}} - \frac{3\frac{1}{4} + 4\frac{1}{2}}{6\frac{1}{2} + 1\frac{1}{2}}.$$

LXVII

Oral.

Rapidly answer :

$$\begin{array}{llllll} \frac{5}{7} = \frac{7}{35} & \frac{2}{16} = \frac{1}{8} & \frac{5}{6} = \frac{7}{36} & \frac{7}{12} = \frac{7}{24} & \frac{7}{8} = \frac{7}{40} & \frac{5}{6} = \frac{7}{12} \\ \frac{5}{18} = \frac{7}{36} & \frac{5}{14} = \frac{7}{28} & \frac{2}{17} = \frac{7}{51} & \frac{11}{14} = \frac{7}{56} & \frac{12}{15} = \frac{7}{30} & \frac{12}{21} = \frac{7}{34} \end{array}$$

- What is the greatest common divisor of 12, 18, 27 ?
- Find the least common multiple of 8, 9, 12.
- How many yards are there in 5 pieces of cloth, each containing $12\frac{3}{4}$ yd. ?
- If eggs are sold at the rate of 18 for 25¢, how much will 6 doz. cost ?
- At \$1.75 a yard, how many yards of broadcloth can be bought for \$49 ?

Rapidly answer :

$$\begin{array}{llllll} \frac{12}{15} = \frac{7}{30} & \frac{5}{48} = \frac{7}{96} & \frac{2}{16} = \frac{7}{34} & \frac{7}{50} = \frac{7}{100} & \frac{22}{32} = \frac{7}{36} & \frac{5}{8} = \frac{7}{100} \\ \frac{22}{48} = \frac{7}{96} & \frac{11}{14} = \frac{7}{28} & \frac{6}{7} = \frac{7}{35} & \frac{10}{18} = \frac{7}{36} & \frac{5}{8} = \frac{7}{54} & \frac{12}{15} = \frac{7}{15} \end{array}$$

- How many bushels of corn, at $62\frac{1}{2}$ ¢ a bushel, can be bought for \$150 ?
- What decimal part of a pound avoirdupois is 14 oz. ?
- How much will 16 hams weigh that average 10 lb. 8 oz. each ?

9. What is the product of one hundred by one hundredth?

10. If 8 men can do a piece of work in 6 days, in how many days should 4 men do it?

Written.

1. A rectangular box will hold 128 bu. What is its volume in cubic feet?

2. What is the depth of a bin containing 240 bu. if its length is 10 ft. and its width 5 ft.?

3. A bin holding 150 bu. is 7 ft. wide and 4 ft. deep. How long is it?

4. How much will 3 lb. 14 oz. avoirdupois cost at \$2.40 an ounce Troy?

5. A drove of cattle eat 6 T. 15 cwt. 87 lb. of hay in a week. How long will 33 T. 19 cwt. 35 lb. last this drove?

6. A bin is 40 ft. long, 10 ft. wide, and 8 ft. deep. How many bushels of corn will it contain approximately?

7. What is the capacity in cubic feet of a bin that holds 5400 bu. of potatoes?

8. Find the amount of grain in a bin 25 ft. long, 14 ft. wide, and 3 ft. deep that is $\frac{3}{4}$ full of grain.

9. Find the diameter of a circular garden, the circumference of which is 1200 ft.

10. A and B can build a house in 30 da., B can build it alone in 45 da. How many days should it take A alone to build it?

LXVIII

Oral.

Rapidly add:

80	76	55	76	95	39	62	55	39	47	56	75	96
2	4	5	5	8	5	5	8	5	5	5	6	8
<u>34</u>	<u>50</u>	<u>40</u>	<u>35</u>	<u>20</u>	<u>40</u>	<u>25</u>	<u>32</u>	<u>51</u>	<u>33</u>	<u>24</u>	<u>34</u>	<u>32</u>

How many cubic inches equal a bushel? How many cubic inches equal a gallon? (Dividing 1728 cu. in. by 231 cu. in. gives as a result 7.48+. Therefore there are about $7\frac{1}{2}$ gal. to a cubic foot. Multiplying the number of cubic feet in the contents of the bin or tank by $7\frac{1}{2}$ will give approximately the number of gallons.)

1. A tank measures 15 ft. in length, 8 ft. in width, and is 4 ft. deep. How many gallons will it hold? (Tell how to solve the example before working it.)

2. A tank 2 ft. wide, 4 ft. high, and 6 ft. long will contain how many gallons? how many bushels? (Analyze the example.)

3. A merchant bought a piece of cloth for \$80, and sold it at 25 % profit. For how much did he sell it?

4. When cloth costing \$5 a yard, is sold for \$4 a yard, what is the loss per cent?

5. If a merchant sells cloth costing \$4 a yard for \$5 a yard, what per cent does he gain?

Rapidly add:

36	35	34	33	32	31	29	28	27	26	25	58	56
8	8	8	8	9	9	2	3	4	5	6	6	7
<u>42</u>	<u>55</u>	<u>46</u>	<u>57</u>	<u>61</u>	<u>50</u>	<u>48</u>	<u>57</u>	<u>63</u>	<u>34</u>	<u>54</u>	<u>72</u>	<u>44</u>

6. Make the statement for the following: A tank 8 ft. long, 6 ft. wide, and 4 ft. deep will hold how many gallons of water? how many bushels of grain?

7. A merchant bought hats at \$5 each, and sold them at a gain of 20 %. For how much did he sell them?

8. A merchant bought hats at \$5 each, and sold them at a loss of 20 %. For how much did he sell them?

9. Five ninths of 81 equals $\frac{2}{10}$ of what number?

10. How many pieces of ribbon $\frac{3}{4}$ yd. long can be cut from 9 yards?

Written.

1. How many gallons of water will a cistern hold that is 6 ft. long, 4 ft. wide, and 4 ft. deep?

2. How many gallons will a tank hold that measures 4 ft. by 3 ft. by $1\frac{1}{2}$ ft.?

3. A tank on the roof of a house is 6 ft. 6 in. long, 4 ft. wide, and 3 ft. 6 in. deep. How many gallons of water will it hold?

4. I have a bin holding 202 bu. 2 pk. of wheat. It is 6 ft. wide and $3\frac{1}{2}$ ft. deep. How long is it?

5. Find the depth of a tank that will hold 2816 gal. and is $7\frac{1}{2}$ ft. square. _____

6. What is the capacity in gallons of a cistern 14 ft. long, 11 ft. wide, and 9 ft. deep?

7. How many bushels of wheat can be put into a bin 5 ft. by 10 ft. and 3 ft. 7 in. deep? How much is it worth at \$1.20 per bushel?

8. What is the value of a block of granite 11 ft. long, 9 ft. wide, and 6 ft. 3 in. high at \$75 a perch?

9. How much is a pile of wood 60 ft. long, 4 ft. wide, and 6 ft. high worth at \$4.50 a cord?

10. How many pounds of paint are required to cover a fence 200 yd. long, 6 ft. wide, if a pound covers $4\frac{1}{4}$ sq. yd.?

LXIX**Oral.**

Rapidly subtract:

386	721	510	630	380	386	457	237	730	668	325
123	468	290	220	279	154	263	124	560	440	279

1. At 20¢ per quart, how much will 2 gal. 3 qt. 1 pt. of maple sirup cost?

2. How many dozen eggs, at 25¢ a dozen, must be given for 100 lb. of sugar at 5¢ a pound?

3. How many cubic feet are there in a wall 30 ft. long, 4 ft. high, and 2 ft. thick?

4. Robert walked $12\frac{3}{4}$ mi. and Henry $10\frac{1}{8}$ mi. How many miles farther than Henry did Robert walk?

5. The difference between 156 and 72 is how many times 12?

Rapidly subtract:

224	471	652	731	520	816	931	621	468	721	550
189	277	276	385	473	348	599	478	123	386	290

6. After spending $\frac{5}{8}$ of his money, William had \$120 left. How much had he at first?

7. If $\frac{3}{4}$ yd. of linen costs 30¢, how many yards can be bought for 80¢?

8. Find $\frac{1}{3}$ of 27 bu. 3 pk. 6 qt.

9. Find $33\frac{1}{3}\%$ of 24 gal. 6 pt.

10. Add $\frac{1}{3}$ to $\frac{5}{8}$ and multiply the result by 4.

Written.

1. A dealer bought 15 cwt. 22 lb. of sugar at \$4.25 a cwt. and 6 cwt. 36 lb. at \$5.60 a cwt. He sold all at 6¢ a pound. How much did he gain or lose?
2. Reduce 57 lb. 18 oz. avoirdupois to Troy weight.
3. A farmer traded 15 bu. 3 pk. of potatoes at \$1.60 a bushel, for peaches at \$1.75 a bushel. How many bushels of peaches did he get?
4. A field 80 rd. long contains 15 A., while another field of the same width contains 9 A. Find the length of the other field. (Make diagrams.)
5. How much will it cost to flag a court 125 ft. long, 82 ft. wide, with flagstones 3 ft. 5 in. long and 2 ft. 6 in. wide, at \$1.87½ a square yard?
6. Divide 35 bu. 1 pk. 2 qt. by 17 bu. 2 pk. 5 qt.
7. Reduce 14 lb. 7 oz. avoirdupois to Troy weight.
8. At \$1.50 a yard how much will it cost to carpet a room 20 ft. long, 18 ft. wide with carpet ¾ yd. wide, 6 inches on every strip except the first being allowed for matching?
9. At 12¢ a pint, how many gallons, etc., can you buy for \$8.52?
10. If for 6½ yd. of cloth I can get 13½ cd. of wood, how many cords can I get for 9½ yd.?

LXX**Oral.**

Rapidly multiply:

87	53	79	84	75	86	72	65	45	46	75	57	98
<u>5</u>	<u>6</u>	<u>2</u>	<u>3</u>	<u>7</u>	<u>8</u>	<u>4</u>	<u>3</u>	<u>8</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>3</u>

1. If I pay 84¢ for $\frac{7}{8}$ yd. of taffeta, how much is it worth a yard?

2. To make a dress a customer bought $18\frac{3}{4}$ yd. of silk. If, after making it, the dressmaker had $2\frac{1}{2}$ yd. left, how much was used in making the dress?

3. A tailor lost $\frac{1}{3}$ of the cost of a suit by selling it at \$21. How much did the suit cost him?

4. If $\frac{5}{8}$ of a certain sum of money is \$245, how much is $\frac{1}{2}$ of it?

5. After drawing $\frac{1}{3}$ of his money from the bank, a boy finds that he has \$28 left. How much had he at first?

Rapidly multiply:

68	79	82	96	56	56	65	42	45	48	52	51	49	37	47
<u>5</u>	<u>3</u>	<u>4</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>3</u>

6. A merchant sold goods for \$1680, which was $\frac{1}{3}$ more than they cost. How many dollars did he gain?

7. A boy had \$80 in a bank and withdrew 20% of it. How many dollars had he left?

8. A boy missed 6 words out of 50. What per cent did he have right?

9. How many eggs are there in a basket if 6 are bad and 98% are good?

10. Find the contents in cubic feet of a box 4 ft. long, 3 ft. wide, and $1\frac{1}{2}$ ft. deep.

Written.

1. How much will it cost to dig a cellar 48 ft. long, 24 ft. wide, and $7\frac{1}{2}$ deep, at 25¢ a load?

2. What is the value of a pile of wood 18 ft. long, $7\frac{1}{2}$ ft. wide, and $5\frac{1}{2}$ ft. high, at \$4 $\frac{1}{2}$ a cord?

3. A vat 12 ft. square contains 1224 cu. ft. How deep is it?

4. A farmer has a bin 10 ft. long, 4 ft. 8 in. wide, and 4 ft. deep. How many bushels of grain will fill it?

5. A cistern containing 5300 gal. of water is 10 ft. square. How deep is it? _____

6. How much will it cost to dig a cellar 15 ft. wide, 22 ft. long, and 7 ft. deep, at 36¢ a load?

7. How many perches of masonry are there in a wall 60 ft. long, 4 ft. 6 in. high, and 15 in. thick?

8. A load of wood containing exactly 1 cord is 5 ft. 4 in. wide, and 3 ft. 9 in. high. How long is it?

9. How many bushels of corn can be put into a bin 6 ft. long, 5 ft. wide, and 4 ft. deep?

10. A man constructed a cistern to hold 2016 gal. The bottom was 6 ft. wide by 8 ft. long. How deep was it?

LXXI

Oral.

Rapidly divide, without reducing the mixed number in the dividend:

$$4 \overline{)48\frac{1}{2}}$$

$$3 \overline{)36\frac{1}{3}}$$

$$5 \overline{)26\frac{1}{2}}$$

$$2 \overline{)27\frac{1}{4}}$$

$$7 \overline{)56\frac{1}{2}}$$

$$3 \overline{)46\frac{1}{2}}$$

$$4 \overline{)50\frac{1}{4}}$$

$$2 \overline{)87\frac{1}{2}}$$

$$6 \overline{)64\frac{1}{4}}$$

$$8 \overline{)65\frac{1}{5}}$$

Tell how to find the contents of a box that is 12 ft. square and 2 ft. deep. Find the contents of this box in cubic feet.

Tell how to find the contents of a box with an altitude of 3 ft. and with a circular base, the area of which is 8 sq. ft. Find the contents of this box in cubic feet.

Tell how to find the area of a circle.*

Knowing the area of the bottom of a tank and the depth of the tank, tell how to find the entire or cubic contents.

1. How many cubic feet does a circular tank 8 ft. deep contain, if the bottom measures 15 sq. ft.?

2. Find the number of cubic inches in a cylinder, the area of the base being 14 in. and the altitude 9 in.

3. Find the area of the base of a cylinder, the radius of which is 3 ft. Find the cubic contents of this cylinder, the altitude being 2 ft.

4. If \$72 is $12\frac{1}{2}\%$ more than my money, how much money have I?

5. If \$56 is $\frac{1}{8}$ less than my money, how much money have I?

Rapidly divide without reducing the mixed number in the dividend:

$$6\overline{)72\frac{1}{2}} \quad 5\overline{)56\frac{1}{4}} \quad 8\overline{)33\frac{1}{2}} \quad 4\overline{)23\frac{1}{4}} \quad 3\overline{)82\frac{1}{2}} \quad 7\overline{)45\frac{1}{2}}$$

6. If the area of the base of a circular tank is 25 sq. ft., and the tank is 6 ft. deep, how many cubic feet does the tank contain?

7. The radius of a circle being 2 ft., find the area.

8. If the circumference of a circle is 66 ft., find the diameter. Find the radius.

* The area of a circle may also be found by multiplying $\frac{1}{2}$ the radius by the circumference, or the square of the diameter by .7854.

9. A pound of tea lasted a man and his wife 3 mo., and the wife alone 4 mo. How long would it last the man alone at this rate?

10. A man bought 25 bbl. of flour. He lost 20% of it, and sold 25% of the remainder. What per cent of the whole remained?

Written.

1. Find the volume of a cylinder having an altitude of 17 in., the area of the base being 30 sq. in.

2. Find the altitude of a cylinder having a volume of 190 cu. ft., the area of the base being 30 sq. ft.

3. Find the area of the base of a cylinder having a volume of 324 cu. ft. and an altitude of 18 ft.

4. How many gallons of water does a circular tank or cistern hold, the area of the base being $78\frac{1}{4}$ sq. in. and the depth (or altitude) 12 in.?

5. How many gallons of water does a cistern hold, the diameter of the base being 42 ft. and the depth 11 ft.?

6. How many cubic feet are there in a cylinder, the area of the base being 25 sq. ft. and the depth 72 in.?

7. How many gallons does a cylindrical tank hold, the area of the base being $19\frac{1}{4}$ sq. ft. and the depth 8 ft.?

8. How many bushels of grain does a cylindrical bin hold, the area of the base being 154 sq. ft. and the depth 7 ft.?

9. What is the capacity in gallons of a cistern 12 ft. deep and 10 ft. in diameter?

10. I own $\frac{3}{10}$ of a steamship and sell $\frac{1}{2}$ of my share for \$3300. What is the value of $\frac{1}{4}$ of the ship at that rate?

LXXII**Oral.**

Rapidly find the results :

$56 + 25$	$81 - 56$	22×8	$168 \div 3$
$47 + 47$	$94 - 57$	24×9	$196 \div 4$
$68 + 22$	$60 - 28$	26×5	$195 \div 5$
$48 + 32$	$72 - 29$	43×7	$198 \div 6$
$29 + 28$	$75 - 19$	37×4	$168 \div 4$
$65 + 26$	$51 - 12$	48×5	$196 \div 7$
$75 + 19$	$63 - 15$	65×2	$147 \div 7$
$94 + 47$	$82 - 16$	99×3	$279 \div 9$

1. What part of the cost is gained by selling for 40¢ what has been bought for 36¢?

2. How much will $\frac{1}{2}$ of a bushel of apples cost at \$1.12 $\frac{1}{2}$ a bushel?

3. How much must I pay for $\frac{1}{2}$ dozen pencils at \$1.20 a gross?

4. How many square rods are there in a triangle having a base of 16 rd. and an altitude of 8 rd.?

5. Find $83\frac{1}{3}\%$ of 72. _____

Rapidly find the results :

$72 + 34$	$47 - 24$	45×4	$124 \div 4$
$56 + 28$	$39 - 15$	47×3	$152 \div 8$
$32 + 23$	$49 - 25$	78×2	$154 \div 7$
$48 + 25$	$52 - 34$	56×3	$279 \div 3$
$67 + 33$	$48 - 32$	52×4	$192 \div 6$
$49 + 22$	$52 - 27$	97×2	$120 \div 5$
$52 + 34$	$72 - 28$	38×4	$234 \div 9$
$39 + 27$	$32 - 23$	56×5	$216 \div 8$

6. What part of 2 rd. is 1 ft. ?
7. What is $33\frac{1}{3}\%$ of 6 gal. 3 qt. ?
8. What per cent of a peck is a pint?
9. I bought 5 bu. of berries for \$5, and sold them at 20¢ a quart. What per cent did I gain?
10. How much will $87\frac{1}{2}\%$ of a bushel of onions cost at 5¢ a quart?

Written.

1. How many bushels of wheat will fill a bin 15 ft. 6 in. long, 3 ft. 6 in. wide, and 6 ft. deep? How many pounds does the wheat weigh? (60 lb. = 1 bu.)
2. What is the circumference of a water pipe that is 6 in. in diameter? (Use 3.1416 as ratio.)
3. What is the area of a cross section of a water pipe 4 in. in diameter? (Use 3.1416 as ratio.)
4. What is the volume of a cylinder having an altitude of 38 in. and a base 125 sq. in. in area?
5. How many gallons of water are there in a well having a diameter of 3 ft. and a depth of 8 ft.?
6. What is the volume in cubic inches of a cylinder 9 ft. high, the diameter of the base being 18 in.?
7. At 12¢ a pound how much will it cost to line a cylindrical tank having a diameter of 21 ft. and a depth of 4 ft., if 5 lb. are allowed to the square foot?
8. Add $7\frac{1}{2}$, $2\frac{1}{8}$, and $3\frac{3}{4}$, and from the sum subtract $4\frac{7}{10}$.
9. How much will it cost to fence a field 85 rd. long and 30 rd. wide at 14¢ a foot?
10. What number diminished by $\frac{2}{3}$ of itself plus $\frac{3}{4}$ of itself leaves a remainder of 240?

LXXIII**Oral.****Rapidly multiply:**

4.5	7.2	3.5	4.8	.56	4.2	.84	.60	1.2	8.7	.96	2.3
<u>8</u>	<u>6</u>	<u>.5</u>	<u>.02</u>	<u>.3</u>	<u>.04</u>	<u>.2</u>	<u>.21</u>	<u>1.1</u>	<u>2</u>	<u>3</u>	<u>.4</u>

1. Seven times $3\frac{1}{2}$ mi. is $5\frac{1}{2}$ times the distance between two towns. What is the distance?

2. How much will $4\frac{3}{8}$ yd. of muslin cost at 16¢ a yard?

3. Peter gave $\frac{1}{5}$ of his marbles to Samuel, and 2 times $\frac{1}{4}$ of them to Robert. How many had he at first, if he gave away 14 marbles?

4. How many times is $\frac{3}{8}$ contained in $\frac{3}{4}$?

5. A boy divided \$14 equally among his companions, giving to each \$ $3\frac{1}{2}$. How many companions had he?

Rapidly multiply:

35.2	3.52	.352	4.1	.31	4.2	.63	5.7	.57	4.9	.43	.007
<u>10</u>	<u>10</u>	<u>10</u>	<u>5</u>	<u>5</u>	<u>.4</u>	<u>.3</u>	<u>2</u>	<u>3</u>	<u>.4</u>	<u>.6</u>	<u>1.2</u>

6. I bought 10 books at 60¢ a book, and sold them at a gain of 50%. How much did I receive for them?

7. What per cent of 2 yd. is 12 in.?

8. If $87\frac{1}{2}\%$ of a bushel of pears costs \$1.40, how much will 1 pk. cost?

9. A school having 3000 pupils on roll, has on a certain day 150 of them absent. What per cent is present?

10. If a farmer sells $\frac{3}{8}$ of $\frac{4}{5}$ of 120 sheep, what part of the flock has he left?

Written.

1. There is a pile of bricks built solid that is 14 ft. long, 8 ft. wide, and 12 ft. high. How many bricks of average size (64 cu. in., or 27 bricks to the cubic foot) are there in the pile?

2. How many bricks of average size will build a wall 124 ft. long, 6 ft. high, and 1 ft. 6 in. thick?

3. How many bricks will it take to build the walls of a house 50 ft. long, 25 ft. wide, 21 ft. high, the walls to be 1 ft. thick? (Deduct $\frac{1}{10}$ of contents for mortar, but make no allowance for doors and corners.*)

4. How much will it cost to put a gilt molding round a room 36 ft. long, 18 ft. wide, at 10¢ a foot?

5. Twenty and a quarter is two and five tenths times what number?

6. How many bricks will it take to build a prison 60 ft. long, 25 ft. wide, and 48 ft. high, with walls 1 ft. thick?

7. How many bricks will build a house 50 ft. deep, 36 ft. high, 22½ ft. wide, with walls 1½ ft. thick? (Deduct $\frac{1}{10}$ of the solid contents for mortar.)

8. How many cubic feet of air are there in a school-room 16 ft. long, 15 ft. wide, and 9 ft. high?

9. At 50¢ a load for digging and \$4 a perch for masonry, find the cost of digging and walling a cellar 40 ft. square and 9 ft. deep, the walls being 1½ ft. thick.

10. Eleven and one quarter is five eighths of what number?

* SUGGESTION: $(50 + 25) \times \frac{1}{2} \times \frac{21}{12} \times \frac{2}{10} \times \frac{27}{1} = ?$

LXXIV

Oral.

Rapidly divide:

$.2\overline{)234}$

$.8\overline{)28}$

$800\overline{)48}$

$.06\overline{)36}$

$30\overline{)5.7}$

$60\overline{).042}$

$.04\overline{)5.6}$

$800\overline{)4.8}$

$.08\overline{).24}$

$.4\overline{).048}$

1. A lady bought ribbon at 16¢ a yard. Had she paid 20¢ a yard, the ribbon would have cost her 24¢ more. How many yards did she buy?

2. How much will 48 sheep cost at \$3.75 a head?

3. On a religious holiday 48 pupils or $\frac{2}{3}$ of a class were absent. How many were on the class register?

4. A man spent $\frac{1}{3}$ of his money and $\frac{2}{3}$ of what was left equaled \$90. How much had he at first?

5. If $\frac{7}{10}$ of a ton of hay is worth \$7, how much is $\frac{3}{4}$ of a ton worth?

Rapidly divide:

$50\overline{)8.55}$

$.07\overline{)84}$

$.007\overline{)84}$

$.7\overline{)840}$

$.063\overline{)12.6}$

$.63\overline{)126}$

$2.5\overline{)62.5}$

$.4\overline{)4.56}$

$.008\overline{)2}$

$.007\overline{)42}$

6. What part of a mile is 40 rd.?

7. There are 60 pupils in a class, 45 % of the number being boys. How many are girls?

8. How many bushels of potatoes, at \$ $\frac{5}{8}$ a bushel, can you buy for \$125?

9. Thirty dollars was $\frac{5}{8}$ of the cost of a watch. The chain cost $\frac{1}{2}$ as much as the watch. How much did they both cost?

10. How much will 45 eggs cost at 40¢ a dozen?

Written.

1. How much will it cost to dig a cellar 42 ft. long, 28 ft. wide, and 6 ft. 6 in. deep, at 42¢ a load (a cubic yard)?

2. How much will it cost to build the walls of a cellar at \$4.75 a perch, the walls being 1 ft. 6 in. thick, 8 ft. high, each side wall 42 ft. and each end wall 24 ft.?

3. Find the cost of digging and walling a cellar 45 ft. long by 24 ft.; cellar 6 ft. deep, walls $7\frac{1}{2}$ ft. high, $1\frac{1}{2}$ ft. thick. The digging is to cost 45¢ a load and the mason work \$4.25 a perch.

4. How much will a pile of wood 28 ft. long, 9 ft. wide, and 7 ft. high cost at \$3.85 a cord?

5. A cistern 9 ft. square contains 1092 cu. ft. How deep is it?

6. Find the cost of digging and walling a cellar 60 ft. long, 25 ft. wide, cellar 8 ft. deep, walls $6\frac{3}{4}$ ft. high, $1\frac{1}{2}$ ft. thick, if the digging costs 42¢ a load and the masonry \$5.50 a perch.

7. Find the cost of digging and walling a cellar 41 ft. 3 in. by 33 ft., the cellar to be 8 ft. deep and the walls $1\frac{1}{2}$ ft. thick, if the digging costs 50¢ a load and masonry \$3.75 a perch.

8. How many hogsheads (63 gal.) will a cistern 11 ft. long, 6 ft. wide, and 7 ft. deep contain?

9. What must be the length of a bin which is 6 ft. wide and $4\frac{1}{2}$ ft. deep to contain 324 bu.?

10. How many perches of stone are there in a pile 14 ft. long, 4 ft. wide, and 2 ft. high?

LXXV

Oral.

Rapidly find the results :

$\frac{5}{8} + \frac{1}{2}$	$\frac{5}{8} - \frac{1}{8}$	$\frac{6}{7} \times \frac{2}{3}$	$\frac{8}{9} + 4$
$\frac{2}{5} + \frac{1}{2}$	$\frac{4}{9} - \frac{1}{2}$	$\frac{5}{8} \times \frac{6}{7}$	$1 + \frac{5}{8}$
$\frac{2}{3} + \frac{1}{4}$	$\frac{5}{6} - \frac{1}{8}$	$\frac{2}{3} \times \frac{5}{6}$	$6 + \frac{4}{7}$
$\frac{2}{9} + \frac{2}{3}$	$\frac{8}{8} - \frac{1}{4}$	$\frac{8}{9} \times \frac{2}{3}$	$\frac{8}{15} + \frac{1}{3}$
$\frac{5}{6} + \frac{2}{3}$	$\frac{6}{7} - \frac{1}{2}$	$\frac{4}{5} \times \frac{3}{4}$	$\frac{2}{14} + \frac{6}{7}$

1. At 5¢ a foot, how much will it cost to put a molding around a room 27 ft. long and 15 ft. wide ?
2. At \$1.75 a rod, how much will it cost to dig a ditch 1 mi. long ?
3. How many pounds of hay, at \$16 per ton, will \$8.80 buy ? (Analyze this.)
4. A stationer, by selling paper at a profit of 5¢ a quire, made \$4.50. How many reams did he sell ?
5. How many surface feet are there in a rectangular piece of marble 4 ft. long, 3 ft. wide, and 2 ft. thick ?

Rapidly find the results :

$\frac{2}{3} + \frac{4}{5}$	$\frac{7}{8} - \frac{2}{4}$	$\frac{5}{8} \times \frac{4}{5}$	$\frac{5}{18} + \frac{5}{9}$
$\frac{5}{8} + \frac{3}{4}$	$\frac{5}{6} - \frac{2}{3}$	$\frac{4}{7} \times \frac{3}{4}$	$\frac{5}{24} + \frac{3}{8}$
$\frac{2}{3} + \frac{2}{4}$	$\frac{7}{10} - \frac{2}{5}$	$\frac{4}{5} \times \frac{5}{6}$	$\frac{9}{14} + \frac{7}{7}$
$\frac{7}{9} + \frac{1}{6}$	$\frac{5}{18} - \frac{1}{9}$	$\frac{6}{7} \times \frac{5}{12}$	$\frac{5}{16} + \frac{1}{2}$
$\frac{5}{16} + \frac{1}{4}$	$\frac{9}{10} - \frac{2}{5}$	$\frac{3}{5} \times \frac{2}{3}$	$\frac{5}{6} + \frac{2}{3}$

6. An agent sells 50 bbl. of flour at \$5 a barrel, and charges 2% for his services. How much does he get for selling the flour ?

7. A farmer sold 40 bu. of potatoes. If this was 25% of his crops, how many bushels had he left?

8. Change $\frac{3}{4}$ of a bushel to quarts.

9. What per cent of any number is the sum of $\frac{4}{5}$ of it and $\frac{1}{5}$ of it?

10. A lot is 5 rd. wide and 16 rd. long. What per cent of an acre is it?

Written.

1. How many bricks will be required to build a house, the walls of which are 48 ft. long, 27 ft. wide, 42 ft. high, and 1 ft. thick, no allowances being made for doors, windows, or corners, but $\frac{1}{10}$ being deducted for mortar?

2. A bin containing 1960 bu. of wheat is $22\frac{1}{2}$ ft. long and 10 ft. wide. How deep is it?

3. How many hogsheads (63 gal.) are there in a tank 7 ft. square and 9 ft. deep?

4. How many cubic feet of air are there in a schoolroom 20 ft. square and $10\frac{1}{2}$ ft. high?

5. A jeweler sold a watch for \$26, which was $33\frac{1}{3}\%$ more than he paid for it. Find the cost.

6. Find the cost of digging and walling a cellar 32 ft. long, 24 ft. wide, 6 ft. deep, walls $1\frac{1}{2}$ ft. thick, if the digging is to cost 15¢ a load, and mason work \$1.25 a perch.

7. Find the area of the base of a circular tank $15\frac{1}{2}$ ft. in circumference.

8. How many hogsheads will a cask 7 ft. deep and 3 ft. in diameter contain?

9. Find the depth of a pail that is 10 in. across and contains 5 gal.

10. Multiply $5\frac{1}{2}$ by $7\frac{3}{8}$ and divide the product obtained by $3\frac{3}{10}$.

LXXVI

Oral.

Rapidly find :

.50 of 16	20% of 50	$66\frac{2}{3}\%$ of 72	$\frac{1}{2}\%$ of 800
$.87\frac{1}{2}$ of 40	75% of 16	$33\frac{1}{3}\%$ of 18	$\frac{1}{8}\%$ of 600
$.33\frac{1}{3}$ of 60	25% of 28	$62\frac{1}{2}\%$ of 24	$\frac{1}{4}\%$ of 1200
$.62\frac{1}{2}$ of 64	40% of 60	$37\frac{1}{2}\%$ of 16	$\frac{1}{5}\%$ of 1000
$.66\frac{2}{3}$ of 36	60% of 20	$16\frac{2}{3}\%$ of 42	$\frac{3}{8}\%$ of 900

A board 16 ft. long and 5 ft. wide contains how many board feet? A board is usually of what thickness? In estimating for building purposes, a board one inch thick is considered as having how many dimensions? A board 12 ft. long, 3 ft. wide, and 1 in. thick has how many board feet? If the board is 2 in. thick, how many board feet has it? how many square feet? (Note. Less than one inch is considered the same as 1 in.)

1. How many board feet are there in a board 16 ft. long and $1\frac{1}{2}$ ft. wide?

2. How many board feet are there in a piece 12 ft. long and 18 in. wide?

3. How many rolls of paper (8 yd. long, $\frac{1}{3}$ yd. wide) will be needed for a room 20 ft. long, 16 ft. wide, and 8 ft. high?

4. A watch was sold for \$240, which was 20% more than it cost. How much did it cost?

5. An article that was bought for \$4 and sold for \$6 gives what per cent gain? _____

Rapidly find :

.35 of 40	40 % of 50	$12\frac{1}{2}$ % of 24	$\frac{2}{3}$ % of 600
.25 of 72	50 % of 84	$37\frac{1}{2}$ % of 56	$\frac{1}{2}$ % of 400
.50 of 36	60 % of 40	$66\frac{2}{3}$ % of 18	$\frac{1}{4}$ % of 120
.75 of 28	80 % of 80	$6\frac{1}{4}$ % of 64	$\frac{3}{4}$ % of 800
.60 of 75	25 % of 64	$8\frac{1}{3}$ % of 60	$\frac{1}{6}$ % of 600

6. How many board feet are there in a board 18 ft. long, 2 ft. wide, and 1 in. thick? If the board is 3 in. thick, how many board feet are there?

7. If 15 sheets of paper cost 10¢, how much will 1 quire cost?

8. What price shall I put on goods that cost \$12, so as to gain $16\frac{2}{3}$ %?

9. What per cent do I gain on goods that I sell for double the cost?

10. If I sold for \$9 a rug that cost me \$12, what was my loss per cent?

Written.

1. If a board is 10 ft. long and 1 ft. 3 in. wide, what is its contents in board feet?

2. How many board feet are there in a stick of timber 30 feet long, 1 ft. 3 in. wide, and 8 in. thick?

3. Find the contents of a tapering board 15 ft. long, 14 in. wide at one end, and 6 in. at the other. (First find the average width in feet.)

4. How many board feet are there in a tapering board 40 ft. long, 15 in. wide at one end, and 12 in. at the other?

5. At \$275 per C board feet how much will 40 boards, each 12 ft. long, 15 in. wide, cost?

6. How many board feet are there in 14 planks, each 16 feet long, 18 in. wide, and 4 in. thick?

7. At \$5½ per C board feet how much will 5 planks, each 15 ft. long, 1 ft. 8 in. wide, and 16 in. thick, cost?

8. At \$4.25 per C find the cost of 10 boards, each 20 ft. long, 2 ft. 3 in. wide, and 5 in. thick.

9. A man bought 19 A. 63 sq. rd. 18 sq. yd.; 25 A. 24 sq. rd. 17 sq. yd.; 52 A. 75 sq. rd. 16 sq. yd. and sold 84 A. 56 sq. rd. 13 sq. yd. How many acres had he left?

10. The dividend is $\frac{7}{8}$ and the quotient $\frac{4}{15}$. Find the divisor.

LXXVII

Oral.

Rapidly answer:

12 is what per cent of 36? of 24? of 48? of 60? of 18? of 16? of 144? of 15?

18 is what per cent of 36? of 20? of 27? of 24? of 21? of 50? of 54? of 90?

16 is $33\frac{1}{3}\%$ more than what number? 16 is $33\frac{1}{3}\%$ less than what number? 24 is 20% less than what number? 24 is 25% less than what number?

How is a number found when the number plus a per cent of itself is given? How is a number found when the number minus a per cent of itself is given?

1. A farmer sold a cow for \$24, which was $33\frac{1}{3}\%$ less than he paid for it. How much did he pay for it?

2. I sold a watch for \$60, which was $33\frac{1}{3}\%$ less than I paid for it. How much did it cost me?

3. I sold another watch for \$60, which was $33\frac{1}{3}\%$ more than I paid for it. How much did it cost me?

4. How many board feet are there in a stick of timber 40 ft. long, 10 in. wide at one end, and 12 in. at the other?

5. How many bricks (ordinary size, 27 to a cubic foot) are there in a pile 10 ft. long, 3 ft. wide, and 9 ft. high?

Rapidly answer :

15 is what per cent of 30? of 20? of 25? of 60? of 18? of 75? of 45?

24 is what per cent of 48? of 36? of 32? of 27? of 72? of 96? of 40? of 84?

6. A man sold a saddle for \$12, which was 40 % less than it cost him. What was the cost?

7. A cart was sold for \$24, which was 40 % less than its first cost. What was the cost?

8. A board that is 10 ft. long, 1 ft. wide, and 2 in. thick contains how many board feet?

9. How wide is a board that is 4 ft. long and contains 3 sq. ft.?

10. An open water tank is 4 feet square. How many square feet of copper will be required to line it?

Written.

1. What number diminished by 70 % of itself equals 432? *

2. What number diminished by 15 % of itself gives 799?

3. What fraction diminished by 40 % of itself equals $\frac{3}{4}$?

4. What fraction increased by 20 % of itself equals $\frac{3}{4}$?

5. A plain wall 14 ft. long and 9 ft. high above the base board is to be papered. How many rolls are needed?

6. A drover sold 40 head of cattle for \$3040, which was $33\frac{1}{3}$ % more than cost. Find the average cost of each.

7. A has \$306, which is 66 % less than B has. How much has B?

8. A merchant cut 34 yd. from a piece of calico and 51% remained. How much was there in the piece?

9. How many rolls of plain paper will it take to cover the four sides of a room 25 ft. long, 20 ft. wide, and 12 ft. high, 2 rolls being allowed for windows and doors? How much will the paper cost at 35¢ a roll?

10. Find 25 % of 6 yd. 2 ft. 6 in.

* SUGGESTION: The number = 100 % or $\frac{100}{100}$ of itself.
 The number diminished by 70 %, or $\frac{70}{100}$, of itself = 30 %, or $\frac{30}{100}$, of itself.
 $432 = 30 \% \text{ or } \frac{30}{100} \text{ of the number.}$
 ? = the number.

LXXVIII

Oral.

Rapidly answer :

10 is $\frac{2}{3}$ of what number ? $\frac{2}{3}$? $\frac{4}{5}$? $\frac{5}{9}$? $\frac{1}{6}$? $\frac{5}{6}$? $\frac{2}{3}$?
 $\frac{1}{10}$? $\frac{4}{5}$?

10 is .25 of what number ? .50 ? $12\frac{1}{2}\%$? $16\frac{2}{3}\%$? 40 % ?
 $8\frac{1}{3}\%$? $62\frac{1}{2}\%$?

20 is $\frac{2}{3}$ of what number ? $\frac{5}{6}$? $\frac{10}{11}$? $\frac{4}{5}$? $\frac{5}{8}$? $\frac{1}{8}$? $\frac{4}{5}$? $\frac{5}{7}$?

20 is $.12\frac{1}{2}$ of what number ? $.62\frac{1}{2}$? 25 % ? 40 % ? 80 % ?
 10 % ? 50 % ?

30 is $\frac{2}{3}$ of what number ? $\frac{2}{3}$? $\frac{3}{4}$? $\frac{5}{8}$? $\frac{6}{7}$? $\frac{15}{16}$? $\frac{10}{11}$?
 $\frac{3}{8}$? $\frac{5}{7}$?

30 is .60 of what number ? .75 ? 30 % ? 15 % ? $66\frac{2}{3}\%$?
 20 % ? $62\frac{1}{2}\%$?

How many degrees are there in the circumference of any circle ?

How many minutes are there in a degree ? How many minutes are there in a circumference ?

What is the length of 1° of a circumference that measures 36 in. ?

How many seconds are there in a minute ? in a degree ?

1. The longitude of New York is $74^\circ 0' 3''$ W. and of Pittsburg, $80^\circ 2' 0''$ W. What is the distance between them in degrees, minutes, and seconds ?

2. The longitude of Chicago is $87^\circ 37' 37''$ W. What is the distance in degrees, minutes, and seconds, between New York and Chicago ?

3. The longitude of Berlin is $13^\circ 23' 44''$ E. and of Paris, $2^\circ 20'$ E. Find the distance between them in degrees, minutes, and seconds.

4. A hostler at a hotel stable fed out 36 half-peck measures of oats. How many bushels did he feed?

5. A merchant buys $\frac{1}{2}$ doz. handsaws, at \$16 a dozen. How shall he sell them to gain 50¢ apiece?

Rapidly answer:

15 is $\frac{3}{5}$ of what number? $\frac{3}{4}$? $\frac{5}{8}$? $.62\frac{1}{2}$? 20%? 60%? 25%? $12\frac{1}{2}$ %?

18 is $\frac{3}{5}$ of what number? $\frac{4}{7}$? $\frac{3}{5}$? .20? .25? 75%? $37\frac{1}{2}$ %? $16\frac{2}{3}$ %? 15%?

21 is $\frac{7}{10}$ of what number? $\frac{3}{4}$? $\frac{7}{10}$? .25? .75? $12\frac{1}{2}$ %? $37\frac{1}{2}$ %? 21%? 15%?

6. How many cubic inches are there in a 6-in. cube?

7. How much a gross must I pay for hairpins so that by selling them for 3¢ a dozen I may gain 1¢ a dozen?

8. A grocer paid \$6.40 for a bushel of cranberries. For how much per quart must he sell them to gain 3¢ a pint?

9. A man had a farm consisting of $6\frac{1}{3}$ A. He sold 2.015 A. How many acres had he left?

10. I exchanged 10 lb. of butter at 15¢ a pound for calico worth $6\frac{1}{4}$ ¢ a yard. How many yards did I receive?

Written.

1. At $3\frac{1}{2}$ bushels an acre, how many bushels of seed oats will be required for a field 660 ft. long and 462 ft. wide?

2. Find the cost, at 12¢ a square foot, of cementing a triangular court, the base of which is 18 ft. and altitude 16 ft.

3. The longitude of Boston is $71^{\circ} 3' 50''$ W., and of St. Louis $90^{\circ} 12' 17''$ W. Find the distance in longitude between these cities.

4. Washington is $77^{\circ} 3' 00''$ W., and Rome is $12^{\circ} 27' 14''$ E. from Greenwich. What is the distance in longitude between these cities?

5. Make out a bill for the following, using your own name for buyer, and that of some firm that deals in the goods, as seller. Receipt the bill. Write a check for the amount, and indorse the check.

1 pr. rubbers @ \$.90.

2 pr. shoes @ \$4.50.

1 pr. slippers @ \$2.50.

6. The longitude of Washington is $77^{\circ} 3' 00''$ W., and of San Francisco is $122^{\circ} 24' 15''$ W. What is the distance in longitude between these cities?

7. Find the cost, at \$48 per M, of 420 joists 18 ft. long, 10 in. wide, and 4 in. thick.

8. The longitude of New York is $74^{\circ} 0' 3''$ W., and of Rome $12^{\circ} 27' 14''$ E. What is the distance in longitude between these cities?

9. At \$1.60 a yard, how much will it cost to carpet a room 21 ft. long, 16 ft. wide, no allowance being made for matching?

10. Multiply 28 rd. 2 yd. 2 ft. by 7.

LXXIX

Oral.

Rapidly answer :

18 is $\frac{1}{2}$ more than what number? $\frac{1}{3}$ more? $.12\frac{1}{2}$ more?
 16 is $33\frac{1}{3}\%$ more? $14\frac{2}{3}\%$ more? 21 is 50 % more? $16\frac{2}{3}\%$ more? 24 is $33\frac{1}{3}\%$ more? 20 % more?

1. Four quarts is what per cent of a bushel?
2. How much will 2 cwt. 10 lb. of beef cost at 6¢ a pound?
3. From $.2\frac{1}{2}$ take $.05\frac{1}{4}$.
4. If $2\frac{1}{2}$ oz. of candy cost \$2, how much will 1 lb. cost?
5. How many yards, feet, and inches are there in 100 in.?

Rapidly answer :

36 is 50 % more than what number? 20 % more? $33\frac{1}{3}\%$ more? $12\frac{1}{2}\%$ more?

48 is $33\frac{1}{3}\%$ more? 20 % more? $14\frac{2}{3}\%$ more? 50 % more?

6. How many grains are there in $\frac{1}{2}$ lb. of gold?
7. How many times is .04 contained in 3.6?
8. Forty-two is .03 of what number?
9. How much will a gold chain, weighing 15 pwt., cost at 8 dimes a pennyweight?
10. How many feet are there in 1 rd. 2 yd. 2 ft.?

Written.

1. Find the cost, at 60¢ a yard, of carpeting a room 18 ft. 8 in. by 15 ft. 9 in. with carpet 27 in. wide, if the strips of carpet extend lengthwise.

2. A cistern can be filled by one pipe in 15 hr. and by another in 20 hr. In what time can the two pipes fill it flowing together?

3. A cellar 40 ft. long and 30 ft. wide contains $2\frac{1}{2}$ ft. of water. At 4¢ a hogshead what will be the cost of pumping it out?

4. From a farm containing 360 A., $\frac{1}{2}$ was sold at one time, and $\frac{1}{2}$ of the remainder at another time. What per cent of the farm remained?

5. How many yards of satin $\frac{5}{8}$ of a yard wide, will line goods 24 yd. long, $\frac{3}{4}$ yd. wide?

6. At \$1.25 a yard, how much will it cost to carpet a room 18 ft. by 24 ft., with carpet $\frac{3}{4}$ yd. wide, the breadths to run lengthwise?

7. A miner took to the mint a bag of gold weighing 2 lb. 6 oz. 17 pwt. 12 gr. What was its value, the weight of \$1 being 25.8 gr.?

8. From a pile of wood containing 960 cu ft., was sold at one time $3\frac{1}{4}$ cd., at another $2\frac{3}{4}$ cd. How much was the remainder worth at \$4 $\frac{1}{4}$ a cord?

9. How many yards $\frac{7}{8}$ yd. wide will line goods 36 yd. long, $\frac{3}{4}$ yd. wide?

10. How much will 7 T. 15 cwt. 56 lb. cost at \$8.75 a ton?

LXXX

Oral.

Rapidly answer:

24 is $\frac{1}{5}$ less than what number? .60 less? $11\frac{1}{3}\%$ less? $14\frac{2}{3}\%$ less? $62\frac{1}{2}\%$ less? 40% less?

36 is 25 % less than what number? 75 % less? $62\frac{1}{2}$ % less? $14\frac{3}{4}$ % less? 20 % less? 40 % less? 80 % less?

1. At \$2 a yard, how much will $12\frac{1}{2}$ yd. of carpet cost?

2. If $\frac{1}{2}$ yd. costs \$ $\frac{3}{5}$, how much will $\frac{7}{8}$ yd. cost?

3. What per cent of a bushel is 3 pk.?

4. A real estate agent sold $\frac{1}{3}$ of an estate to one man, $\frac{1}{5}$ of it to another, and $\frac{1}{4}$ of it to another. What part of the estate was left?

5. What part of $\frac{3}{4}$ is $\frac{1}{5}$? _____

Rapidly answer:

48 is 25 % less than what number? 75 % less? $62\frac{1}{2}$ % less? $14\frac{3}{4}$ % less? 20 % less? 40 % less? 80 % less?

18 is 25 % less than what number? 75 % less? $62\frac{1}{2}$ % less? $14\frac{3}{4}$ % less? 40 % less? 80 % less?

6. From $.2\frac{1}{2}$ take $.05\frac{1}{4}$.

7. James is 18 yr. old, and his age is $\frac{3}{8}$ of his father's age. How old is his father?

8. If the divisor is .8 and the dividend is 12, what is the quotient?

9. If $.62\frac{1}{2}$ of a yard costs \$2.50, how many yards can be bought for \$20?

10. At \$ $2\frac{1}{2}$ per C., how much will 375 ft. of lumber cost?

Written.

1. How much will a mahogany log 20 ft. long, 16 in. wide, and 10 in. thick cost at 60¢ a board foot?

2. In excavating a cellar 3240 cu. ft. of earth was removed by 3 men in 8 days. How many cubic yards or loads did each man remove daily?

3. I bought 12 spoons weighing 1 lb. 10 oz. 6 pwt. What was the weight of each spoon?

4. A farmer sold a cow for \$50, which was 20% less than he paid for it. How much did he lose?

5. A flour merchant sold flour for \$6.25 a barrel, which was 25% more than it cost him. How much did it cost him?

6. How much will 12 planks, each 14 ft. long, $12\frac{1}{2}$ in. wide, and $2\frac{1}{2}$ in. thick, cost at \$18 per M?

7. I started on a tour around the world at 10 o'clock A.M., Sept. 9, 1910, and returned to the same depot at 4 o'clock P.M., June 14, 1912. How long was I absent?

8. What is the weight of 2 dozen spoons, if each spoon weighs 3 oz. 12 pwt. 15 gr.?

9. A man sold a horse for \$240, which was 20% more than it cost him. How much did he gain?

10. After giving away $14\frac{2}{3}$ % of my money, I had \$2 left. How much had I at first?

FIFTH MONTH

GENERAL REVIEW

LXXXI

Oral.

Rapidly add :

21	22	32	12	21	12	24	21	22	24	34	12	22	15	28
23	21	12	12	32	42	31	32	23	12	32	14	32	42	32
<u>24</u>	<u>13</u>	<u>24</u>	<u>31</u>	<u>35</u>	<u>25</u>	<u>14</u>	<u>25</u>	<u>32</u>	<u>34</u>	<u>33</u>	<u>24</u>	<u>42</u>	<u>24</u>	<u>12</u>

1. I bought a pound of candles for 14¢, a pound of coffee for 28¢, and a bar of soap for 5¢. Find the cost of all.

2. A man bought a sleigh for \$20, paid \$10 for repairing it, and \$6 for painting it. How much did it cost him?

3. Reuben has $\frac{2}{5}$ of a dollar, Charles $\frac{3}{5}$ of a dollar, and James $\frac{1}{5}$ of a dollar. How many fifths of a dollar have they all? How many dollars have they?

4. A grocer sold $\frac{1}{2}$ doz. eggs to one man, $\frac{1}{3}$ doz. to another, and $\frac{1}{6}$ doz. to another. How many did he sell to all?

5. Jane paid \$2 $\frac{1}{2}$ for a dress, \$1 $\frac{3}{4}$ for a pair of shoes, and \$ $\frac{1}{2}$ for some ribbon. Find the cost of all.

Rapidly add :

22	25	32	13	31	23	12	25	13	14	22	12	14	16	14
43	14	26	34	13	31	31	23	23	24	33	24	28	22	32
<u>13</u>	<u>23</u>	<u>22</u>	<u>26</u>	<u>25</u>	<u>24</u>	<u>23</u>	<u>34</u>	<u>33</u>	<u>34</u>	<u>44</u>	<u>36</u>	<u>12</u>	<u>13</u>	<u>25</u>

6. Emma bought a slate for $\$ \frac{1}{4}$, and an arithmetic for $\$ \frac{1}{5}$. Find the cost of both.

7. James earned $\$ \frac{1}{4}$ on Monday, $\$ \frac{1}{5}$ on Tuesday, and $\$ \frac{1}{2}$ on Wednesday. How much did he earn in the three days?

8. If it takes $3\frac{1}{2}$ yd. of cloth for a coat, $2\frac{1}{4}$ yd. for a pair of trousers, and $\frac{3}{8}$ yd. for a vest, how many yards of cloth will be needed for the whole suit?

9. Find the sum of $2\frac{1}{2}$ and $3\frac{1}{3}$.

10. If a man walks $12\frac{1}{3}$ mi. in the forenoon and $10\frac{1}{2}$ mi. in the afternoon, how many miles does he walk during the day?

Written.

1. Add : 8859
9244
4396
6871
9549
9867
4308
3236
7657
8394
2785
4958

2. In 1910 the population of New York City was 4766883; of Philadelphia, 1549008; of St. Louis, 687029; of Chicago, 2185283; and of Cleveland, 560663. What was the total population of these cities?

3. Find the sum of $\frac{2}{3}$, $\frac{3}{5}$, $\frac{7}{10}$, $\frac{2}{5}$, and $\frac{1}{2}$.

4. I gave away $\$ 38\frac{1}{4}$, and had $\$ 5\frac{3}{4}$ left. How much had I at first?

5. A man bought 4 pieces of cloth. The first contained $37\frac{1}{2}$ yd.; the second, $41\frac{5}{8}$ yd.; the third, $27\frac{3}{4}$ yd.; the fourth, $38\frac{3}{8}$ yd. How many yards in all did he buy?

6. Add: 15784

18929

14668

24534

34652

44258

18836

24887

22775

26868

7. A man paid \$375 for a carriage, \$250 for a horse, and \$150 for a harness. How much did he pay for all?

8. Find the sum of $\frac{3}{25}$, $\frac{2}{5}$, and $\frac{1}{10}$.

9. A bicycler rode $27\frac{3}{4}$ mi. on Monday, $33\frac{1}{2}$ mi. on Tuesday, $37\frac{1}{4}$ mi. on Wednesday, and $42\frac{1}{2}$ mi. on Thursday. How far did he ride

in the four days?

10. Find the value of $8\frac{1}{2} + \frac{3}{4} + 5\frac{1}{6} + 7\frac{2}{3}$.

LXXXII

Oral.

Rapidly add:

$\frac{1}{2} + \frac{1}{4}$	$\frac{1}{2} + \frac{3}{4}$	$\frac{1}{2} + \frac{2}{3}$	$\frac{3}{4} + \frac{2}{3}$	$\frac{1}{5} + \frac{1}{6}$	$\frac{1}{2} + \frac{1}{3}$
$\frac{1}{2} + \frac{1}{3}$	$\frac{1}{2} + \frac{2}{3}$	$\frac{1}{4} + \frac{2}{3}$	$\frac{3}{4} + \frac{1}{3}$	$\frac{2}{3} + \frac{1}{6}$	$\frac{1}{4} + \frac{1}{5}$
$\frac{1}{2} + \frac{2}{3}$	$\frac{1}{2} + \frac{1}{6}$	$\frac{2}{4} + \frac{1}{6}$	$\frac{1}{4} + \frac{1}{6}$	$\frac{1}{3} + \frac{1}{4}$	$\frac{2}{3} + \frac{2}{3}$

1. James had 12 marbles, and John had $\frac{2}{3}$ as many lacking 4. How many marbles had John?

2. Richard had \$360, $\frac{1}{3}$ of which he spent for a horse, and $\frac{1}{3}$ for a sleigh. How much had he remaining?

3. Mr. Brown gave \$70 for a watch and $\frac{2}{3}$ as much for a chain, and sold them both for \$90. How much did he lose?

4. Find the sum of .28 and .37.

5. Find the difference between .75 and .32.

Rapidly add :

$$\begin{array}{cccccc}
 \frac{1}{2} + \frac{2}{3} & \frac{3}{8} + \frac{1}{6} & \frac{2}{3} + \frac{5}{8} & \frac{1}{2} + \frac{5}{8} & \frac{1}{4} + \frac{5}{8} & \frac{1}{2} + \frac{1}{6} \\
 \frac{1}{2} + \frac{5}{8} & \frac{3}{4} + \frac{5}{8} & \frac{1}{2} + \frac{7}{8} & \frac{1}{4} + \frac{7}{8} & \frac{1}{4} + \frac{5}{8} & \frac{3}{4} + \frac{2}{3} \\
 \frac{1}{2} + \frac{1}{8} & \frac{1}{4} + \frac{1}{8} & \frac{1}{6} + \frac{1}{10} & \frac{1}{2} + \frac{3}{8} & \frac{1}{4} + \frac{3}{8} & \frac{1}{8} + \frac{5}{8}
 \end{array}$$

6. A man having 40 sheep, lost 20 and found only $\frac{2}{3}$ of the number he lost. How many sheep had he then?

7. A grocer having 27 baskets of peaches sold $\frac{2}{3}$ of them. How many did he sell? How many had he left?

8. A merchant having 40 bbl. of flour, sold $\frac{3}{4}$ of them, and then bought $\frac{1}{3}$ as many barrels as he sold. How many had he then?

9. Find the sum of .25 and .3.

10. Find the difference between .56 and .08.

Written.

1. Find the sum of 151.39, 19.058, 1900.07, 6.705, 80.8, 2785.25, and 345.045.

2. How many rods of fence will inclose a field, the sides of which are respectively 34.72 rd., $48\frac{1}{5}$ rd., $95\frac{3}{8}$ rd., 152.17 rd., and $56\frac{1}{2}$ rd.?

3. Find the sum of 156 bu. 3 pk. 5 qt. 1 pt., 397 bu. 1 pk. 7 qt., 549 bu. 6 qt. 1 pt., and 95 bu. 2 pk. 6 qt.

4. How many miles, rods, and feet are there in the sum of 75.15625 mi., $129\frac{7}{12}$ mi., $169\frac{8}{15}$ mi., and $228\frac{1}{4}$ mi.?

5. Reduce $325\frac{1}{2}$ to an improper fraction.

6. Find the sum of .8046, .70007, .069, .320032, .01009, and 7.854.

7. A man who owned 4 plots of ground had them surveyed. The first contained 87.875 A., the second 59.3125 A., the third 125.125 A. and the fourth 71.6875 A. How much land was there in the four plots?

8. Find the sum of 12 lb. 5 oz. 13 pwt., 21 lb. 8 oz. 15 pwt., 13 lb. 7 oz. 10 pwt., 51 lb. 3 oz. 17 pwt.

9. Find the value of $\frac{5}{8}$ mi. + $13\frac{1}{8}$ rd.

10. Reduce $1\frac{631}{104}$ to a mixed number.

LXXXIII

Oral.

Rapidly add :

bu.	pk.	bu.	qt.	pk.	qt.	gal.	qt.	gal.	pt.
4	2	5	3	3	2	4	2	8	1
3	1	4	2	4	5	3	1	5	2
1	2	6	5	7	1	6	3	7	3

1. If I buy sheep at \$6 a head, and sell them at \$8 a head, how much do I make on 20 sheep?

2. How much will 3 gal. of milk cost at 8¢ a quart?

3. At \$7 a cord, how much will $\frac{5}{8}$ of a cord of wood cost?

4. If a man can walk $3\frac{3}{4}$ mi. an hour, how far can he walk in $\frac{1}{4}$ of an hour?

5. If a grocer sells apples at the rate of 5 for 3¢, how much does he receive for 10 apples?

Rapidly add :

yd.	ft.	ft.	in.	yd.	in.	oz.	pwt.	pwt.	gr.
5	1	8	5	7	8	4	3	6	5
4	2	2	1	5	3	6	4	4	5
3	2	6	4	6	4	2	2	3	2

6. If I exchange 6 T. of hay, at \$9 a ton, for 20 cords of wood, at \$3 a cord, how much cash must I pay?

7. I buy 5 qt. of chestnuts at 8¢ a quart, and 5 qt. at 5¢ a quart. How much do I gain if I sell all at 9¢ a quart?

8. How much will $\frac{3}{4}$ gal. of molasses cost at $\$ \frac{4}{5}$ per gallon?

9. If $\frac{2}{3}$ of \$8 $\frac{1}{2}$ will pay a certain bill, how much is the bill?

10. A watch cost \$60, and $\frac{1}{2}$ of its cost is twice the cost of the chain. Find the cost of the chain.

Written.

1. In 1900 New York State had a population of 7268894, and in 1910, a population of 9113614. What was the increase in the population during those ten years? What fraction of increase was there? what decimal?

2. The population of the city of New York in 1910 was 4766883. What fractional part of the state population was the population of the city of New York? What decimal part of the state population was the city population?

3. A drover sold some sheep for \$8375 $\frac{3}{4}$, and by so doing gained \$1986 $\frac{1}{2}$. How much did they cost?

4. Of a farm containing 697 $\frac{1}{2}$ A., 256 $\frac{1}{2}$ A. were in wheat, 297 $\frac{3}{4}$ A. in grass, and the remainder in corn. How much was in corn?

5. Reduce $\frac{9}{1600}$ to a decimal fraction.

6. In 1910 the total vote for governor in New York State was 1437010, of which Mr. Dix received 689700. How many votes did his opponents receive? What per cent of the votes did Mr. Dix receive?

7. Two men undertook to save \$1000 apiece. When one of them lacked $\$635\frac{1}{2}$ of having \$1000 they both together had $\$987\frac{3}{4}$. How much had each at that time?

8. Find the sum of $\frac{7}{10}$, $\frac{2}{5}$, $\frac{2}{15}$, and $\frac{9}{30}$.

9. The common stock of the American Beet Sugar Co. sold in 1910 for $\$37\frac{1}{2}$ per share, and a year later for $\$59\frac{1}{4}$. Find the gain per share in dollars.

10. Reduce $.056\frac{1}{2}$ to a common fraction.

LXXXIV

Oral.

Rapidly make change from a dollar when you owe:

55¢; 13¢; 70¢; 35¢; 15¢; 37¢; 28¢; 63¢.

Make change from two dollars when you owe:

\$1.15; \$1.49; \$1.83; \$1.28; \$1.16; \$.87; \$.94.

1. From $.6\frac{1}{2}$ take $.05\frac{1}{2}$.

2. Find the difference between $1\frac{1}{2}$ and .15.

3. A ton of coal is worth \$6.50. How much is $.37\frac{1}{2}$ of a ton worth?

4. The gas bill for September was \$1.20. For October it was $33\frac{1}{3}\%$ more. How much was it in October? If it had been only .3 more for October, how much would the bill have been?

5. At \$6 per ton, how much will 900 lb. of coal be worth?

Rapidly subtract:

96	75	88	68	78	99	87	48	97	89	76	95	94
<u>73</u>	<u>42</u>	<u>65</u>	<u>23</u>	<u>37</u>	<u>25</u>	<u>46</u>	<u>32</u>	<u>62</u>	<u>31</u>	<u>24</u>	<u>43</u>	<u>22</u>

6. If 4 apples cost 7¢, how many apples can be bought for \$.35?

7. If \$30000 worth of real estate is taxed \$450, how much will \$1000 worth be taxed?

8. How much will \$20000 worth of real estate be taxed at \$1.70 per thousand?

9. If a ton of coal costs \$5, how much will 6500 lb. cost?

10. At \$2 per 1000 ft., find the cost of 3125 ft. of lumber.

Written.

1. From $.6\frac{1}{2}$ take $.287\frac{3}{8}$.

2. In a mass of metal there are 183.741 lb.; $\frac{1}{3}$ of it is iron, 25.305 lb. are copper, and 3.0009 lb. are silver. The balance is lead. How much lead is there in it?

3. $12\frac{1}{2}$ ¢ is what per cent of \$2.75?

4. A grocer bought 8 bu. 3 pk. 6 qt. of peaches at one time, 15 bu. 2 pk. 7 qt. at another time, and then sold 10 bu. 1 pk. 5 qt. How much had he remaining?

5. $(2\frac{3}{4} - 1\frac{1}{2}) + (.9 - \frac{3}{16}) = ?$

6. From $.7\frac{5}{8}$ take $.345\frac{1}{8}$.

7. A merchant bought 100 yd. of muslin. He sold $\frac{1}{4}$ of it to one person and $\frac{2}{5}$ of the remainder to another. How much was the remainder worth at 25¢ a yard?

8. How long was it from May 15, 1903 to April 10, 1912?

9. What was the exact number of days from April 16, 1911 to Nov. 21, 1911?

10. Simplify $\frac{3\frac{1}{2} + 2\frac{3}{4}}{\frac{1}{2} \times \frac{1}{3} \times \frac{1}{4}}$.

Oral.

LXXXV

Rapidly subtract :

$$\begin{array}{cccccc} \frac{1}{2} - \frac{1}{4} & \frac{1}{3} - \frac{1}{6} & \frac{2}{5} - \frac{1}{5} & \frac{3}{8} - \frac{1}{8} & \frac{1}{4} - \frac{1}{8} & \frac{3}{4} - \frac{1}{4} \\ \frac{3}{4} - \frac{2}{4} & \frac{4}{6} - \frac{1}{2} & \frac{3}{4} - \frac{2}{4} & \frac{3}{4} - \frac{1}{6} & \frac{1}{2} - \frac{2}{6} & \frac{3}{4} - \frac{1}{4} \end{array}$$

1. A man one day deposited \$40 in a bank, which was \$15 less than he deposited the day before. How much did he deposit in the two days?

2. A lady having \$18 $\frac{3}{4}$ bought a bonnet for \$5 $\frac{1}{4}$. How much money had she left?

3. If 6 men can do a piece of work in 10 $\frac{1}{2}$ da., how long at this rate would it take one man to do the work?

4. A boy having $\frac{2}{10}$ of a dollar, spent $\frac{1}{2}$ of it and lost $\frac{1}{3}$ of it. What part of a dollar had he left? How many cents had he left?

5. How many quarts are there in 1 bu. and 3 pk.?

Rapidly subtract :

$$\begin{array}{cccccccc} 4.5 & .7.1 & 4.3 & 1.0 & 2.5 & 3.4 & 1.2 & .56 \\ \hline 3.2 & .05 & .15 & .8 & 1.08 & 1.12 & .07 & .18 \end{array}$$

6. If a man earns \$1.75 a day, and pays 85¢ a day for board, how much can he save in 6 da.?

7. How many inches less 1 ft. is $\frac{1}{3}$ ft. + $\frac{1}{4}$ ft. + $\frac{1}{6}$ ft.?

8. A man owned $\frac{1}{6}$ of the stock of a store and sold $\frac{2}{3}$ of his share. What part of the stock did he still own?

9. What per cent of $\frac{4}{5}$ is $\frac{1}{2}$?
 10. Reduce 2 gal. 1 qt. 1 pt. to pints.

Written.

1. Add: \$5499.85
 487.16
 1502.75
 2996.83
 6001.48
 3189.40
 494.63
 56.27
 384.32
 5779.48
2. A farmer received \$750 for his wheat, \$145.85 for his oats, \$190 for his rye, and \$213.75 for his corn. He paid \$115 for taxes, \$80 for labor, and \$165 for other expenses. How much did he save?
3. From 100 take the sum of $35\frac{1}{6}$ and $43\frac{7}{8}$.
4. Find the time from Feb. 6, 1911 to Sept. 14, 1913.

5. Simplify $\frac{3\frac{1}{2} \times 2\frac{1}{2} + \frac{9}{11}}{1\frac{1}{2} \times \frac{1}{8} + \frac{9}{11}}$

6. Add: \$5634.28
 875.63
 5764.47
 346.81
 458.75
 29.86
 8681.24
 2424.97
 1550.00
 150.47
7. A dry goods clerk cut $3\frac{1}{4}$ yd., $4\frac{5}{8}$ yd. and $12\frac{1}{2}$ yd. from a piece of silk containing $30\frac{1}{4}$ yd. How many yards remained?
8. $453 - (32\frac{1}{5} + 1\frac{2}{3} - 10) = ?$
9. Simplify $8.763 - 4.12 + .78326 - 68.0816$.
10. On a railway 94 mi. 186 rd. 1 yd. 2 ft. 7 in. long, 68 mi.

259 rd. 4 yd. 1 ft. 10 in. of the road are run by electricity.
 How many miles of the road are run by steam?

Oral.

LXXXVI

Rapidly subtract :

pwt.	gr.	oz.	pwt.	bu.	pk.	pk.	qt.	gal.	qt.
9	4	10	5	15	1	18	4	9	2
6	3	8	6	8	3	10	5	6	3

1. How many hours are you awake if you rise at 7 o'clock A.M. and go to bed at 9 o'clock P.M.?

2. How many minutes are you in school if you arrive at 20 min. of 9 o'clock and remain till noon?

3. How many scores are there in 100?

4. If chestnuts are bought for \$2 a half bushel, and sold for 20¢ a quart, what is the gain?

5. How many feet are there in 6 yd. 2 ft.?

Rapidly subtract :

yd.	in.	pk.	qt.	hr.	min.	gal.	pt.	pt.	gi.
8	3	15	1	5	8	10	3	9	1
5	4	6	2	3	10	4	5	7	3

6. What part of a mile is 200 ft.?

7. At \$ $\frac{1}{2}$ a foot, how much will 3 yd. 2 ft. of lead pipe cost?

8. Name the months that have 30 days each; 31 days.

9. How many days are there from Aug. 1 to Oct. 10?

10. Reduce $\frac{5}{8}$ gal. to lower denominations.

Written.

1. Multiply 342 by 235. Multiply 70140 by 5400.

2. Divide, using cancellation :

$$24 \times 30 \times 7 \text{ by } 16 \times 27 \times 11.$$

$$48 \times 26 \times 17 \times 50 \text{ by } 32 \times 13 \times 34 \times 40.$$

3. In 1911 the expenses of governing the city of New York were approximately \$160000000. The educational department required $\frac{1}{6}$ of this, the health department $\frac{1}{10}$, and the fire and police departments together $\frac{3}{18}$. How many dollars did each of these departments require? How many dollars did the three together spend?

4. On a piece of property worth \$5000, how much would a citizen have to pay, the tax rate being \$1.72 per thousand?

5. In $\frac{5}{8}$ of a mile of subway, how many rods, yards, feet, and inches are there?

6. Multiply $\frac{4}{5}$ by $\frac{1}{2}$ by $\frac{3}{4}$. Multiply $72\frac{1}{2}$ by $85\frac{1}{2}$.

7. Multiply 21.35 by .035. Multiply 121.48 by .00025.

8. A farmer sold 8 loads of hay, each containing 17 cwt. 38 lb. How much did he sell?

9. If a pipe discharges 5 hhd. 30 gal. 2 qt. of water in an hour, how much will it discharge in a day?

10. Reduce $\frac{4}{5}$ of a pound Troy to lower denominations.

LXXXVII

Oral.

Rapidly multiply :

28	17	16	15	25	16	19	28	27	24	26	14	16	23	18
<u>3</u>	<u>4</u>	<u>8</u>	<u>7</u>	<u>4</u>	<u>5</u>	<u>2</u>	<u>4</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>8</u>	<u>9</u>	<u>6</u>	<u>3</u>

1. If 8 school desks are worth \$24, how much are 36 desks worth?

2. How many barrels of flour, at \$8 a barrel, will pay for 360 bu. of wheat at \$2 a bushel?

3. If $\frac{3}{4}$ bu. of cranberries is worth \$3, how much is $\frac{1}{2}$ of 6 bu. worth?

4. If 10 boxes of chalk cost \$.80, what part of 80¢ will 5 boxes cost?

5. Change .25 of a yard to inches.

Rapidly multiply :

15	25	17	15	19	17	28	26	17	18	19	20	24	26	18
6	2	20	8	3	4	2	3	5	4	7	6	7	8	9

6. If a man receives \$30 for acting as polling clerk for 5 da., how many dollars does he earn in 3 da.?

7. How many days' work, at \$4 a day, will pay for 3 T. of coal worth \$8 a ton?

8. If 3 lb. of coffee cost $\$ \frac{2}{10}$, how much will 5 lb. cost?

9. If in $2\frac{1}{2}$ trips a car takes in fares amounting to \$1.50, how much at the same rate, will 5 trips produce?

10. How many inches are there in .75 of a yard?

Written.

1. Divide 426781 by 3000. Divide 714326 by 89.

2. The city can purchase coal at the rate of $5\frac{1}{2}$ T. of coal for \$30 $\frac{1}{4}$. What is the cost of the coal used in a school building for 7 mo., an average of 20 T. a month being used?

3. If $7\frac{1}{2}$ bbl. of apples cost \$11 $\frac{1}{2}$, what will be the cost of $37\frac{1}{2}$ bbl.?

4. Reduce $\frac{\frac{2}{3} \text{ of } \frac{3}{4}}{\frac{1}{2} + \frac{2}{3}}$ to its simplest form.

5. Reduce .9875 gal. to lower denominations.

6. Divide 48 by $6\frac{3}{4}$. Divide $216\frac{1}{2}$ by $20\frac{3}{4}$.
7. If \$573 $\frac{3}{4}$ will buy $12\frac{3}{4}$ T. of iron, how many tons will \$1237 $\frac{1}{2}$ buy?
8. Reduce $\frac{\frac{3}{4} \text{ of } \frac{8}{9}}{\frac{7}{8} \text{ of } \frac{7}{11}}$ to its simplest form.
9. How many yards of carpet a yard wide will it take to carpet a library 20 ft. long and 18 ft. wide?
10. Reduce .8 bu. to lower denominations.

LXXXVIII

Oral.

Rapidly multiply:

$\frac{1}{2} \times \frac{10}{11}$	$\frac{1}{3} \times \frac{3}{7}$	$\frac{1}{4} \times \frac{8}{9}$	$\frac{2}{3} \times \frac{3}{8}$
$\frac{4}{7} \times \frac{7}{8}$	$\frac{1}{2} \times \frac{8}{11}$	$\frac{1}{3} \times \frac{6}{11}$	$\frac{1}{4} \times \frac{12}{13}$
$\frac{3}{8} \times \frac{5}{9}$	$\frac{4}{5} \times \frac{3}{4}$	$\frac{1}{2} \times \frac{6}{7}$	$\frac{1}{3} \times \frac{9}{10}$
$\frac{3}{4} \times \frac{2}{3}$	$\frac{4}{5} \times \frac{3}{8}$	$\frac{2}{3} \times \frac{9}{10}$	$\frac{2}{3} \times \frac{4}{5}$

1. At the rate of \$1 $\frac{1}{2}$ for 2 gal. of ink, how much will 10 gal. be worth?
2. David having 20 qt. of blueberries sold $\frac{4}{5}$ of them for \$ $\frac{4}{5}$. How much was that a quart?
3. If 25 lb. of flour cost 5 dimes, how much will $\frac{3}{8}$ cwt. cost?
4. How much will .05 A. of land cost if .125 A. costs \$15?
5. A grocer sold 1 pk. 4 qt. of peas to one customer and 2 pk. 4 qt. to another. How much did he sell to both?

Rapidly multiply:

$$\frac{1}{5} \times \frac{5}{8}$$

$$\frac{4}{5} \times \frac{5}{8}$$

$$\frac{2}{5} \times \frac{5}{12}$$

$$\frac{2}{5} \times \frac{5}{9}$$

$$\frac{1}{5} \times \frac{10}{11}$$

$$\frac{4}{5} \times \frac{10}{12}$$

$$\frac{2}{5} \times \frac{5}{6}$$

$$\frac{2}{5} \times \frac{10}{11}$$

$$\frac{2}{5} \times \frac{5}{8}$$

$$\frac{2}{5} \times \frac{5}{6}$$

$$\frac{2}{5} \times \frac{6}{11}$$

$$\frac{2}{5} \times \frac{3}{4}$$

$$\frac{2}{5} \times \frac{15}{16}$$

$$\frac{2}{5} \times \frac{5}{4}$$

$$\frac{5}{6} \times \frac{12}{10}$$

$$\frac{2}{5} \times \frac{10}{8}$$

6. How much will 500 lb. of coal cost at \$6.10 per ton?

7. If 10 bu. of wheat cost \$13 $\frac{3}{4}$, how much does 1 bu. cost?

8. The ground for a schoolhouse and yard cost \$96000. Find the value of the part used for the playground, which is $\frac{7}{30}$ of the whole ground?

9. At \$ $\frac{4}{5}$ a gallon, how many gallons of ink can be bought for \$120?

10. Forty-two is $\frac{7}{8}$ of what number?

Written.

1. Divide 21.6 by .006. Divide .018 by 3600.

2. An agent charged \$5.85 for collecting a bill of \$260. What was his charge per dollar?

3. If 17 bu. 3 pk. 4 qt. of apples will fill 8 boxes of equal size, how much will each box hold?

4. A milkman in a month of 30 da. served his customers with 5068 gal. 1 pt. of milk. What was the average daily delivery?

5. What part of 4 ft. 8 in. is 3 ft. 6 in.?

6. Divide .13 by .026. Divide .4 by .008.
7. Find the value of $(18.25 + 6.25) + (3\frac{7}{8} - .275)$.
8. How many times is 6 T. 1 cwt. 15 lb. 7 oz. contained in 48 T. 9 cwt. 23 lb. 8 oz.?
9. A farmer delivered for shipment 2110 bu. 2 pk. of grain in 18 wagon loads. What average amount per load did he deliver?
10. What decimal part of \$6 is \$1.25?

LXXXIX**Oral.**

Rapidly multiply :

8.2	4.5	1.05	.008	.5	.025
<u>.2</u>	<u>3</u>	<u>.2</u>	<u>.4</u>	<u>.05</u>	<u>3</u>
.018	.41	8.1	.25	1.2	.015
<u>.3</u>	<u>2</u>	<u>5</u>	<u>.8</u>	<u>.04</u>	<u>.8</u>

$$8 \times 4, + 3, + 5, \times 7, + 2, + 3 = ?$$

$$4 \times 7, - 3, + 5, \times 9, + 3, + 16, \times 4 = ?$$

1. At 8 dimes a foot, how many dollars will 3 yd. 1 ft. of iron railing cost?
2. The class had 36 readers, of which $\frac{4}{9}$ were in poor condition. How many were in good condition?
3. A teacher's salary was \$750. She spent $.33\frac{1}{3}$ of it for rent and food. How much did she spend? How much had she left?

4. In a school of 600 pupils $83\frac{1}{3}\%$ are boys. How many are girls?

5. Find $12\frac{1}{2}\%$ of 48 A.; $62\frac{1}{2}\%$ of \$2400; $\frac{1}{2}\%$ of 800 ft.

Rapidly multiply:

1.7	1.8	14	.15	.17	.28
<u>3</u>	<u>.2</u>	<u>.4</u>	<u>6</u>	<u>.2</u>	<u>.03</u>

16	1.8	.5	.05	.005	.005
<u>.04</u>	<u>.03</u>	<u>.12</u>	<u>.8</u>	<u>.8</u>	<u>.08</u>

$$3 \times 4, + 8, + 4, \times 6, + 6, + 6 = ?$$

$$6 \times 8, - 8, + 5, \times 3, + 6, + 5 = ?$$

6. A bicycle marked \$96 was sold at a reduction of $12\frac{1}{2}\%$. How much was lost?

7. On a holiday $33\frac{1}{3}\%$ of the 540 boys on register in a school were absent. How many were absent?

8. A merchant paid \$.80 a yard for silk. For how much must he sell it to gain $12\frac{1}{2}\%$?

9. A grocer bought peaches at \$.75 a basket, and sold them at a loss of 20%. For how much did he sell them?

10. Find $66\frac{2}{3}\%$ of 1500 gal.; $\frac{3}{4}\%$ of \$1200.

Written.

1. What part of a mile is 293 yd. 1 ft.?

2. Reduce 5 T. 17 cwt. 25 lb. to T. and the decimal of a ton.

3. Add 16 lb. 10 oz. 18 pwt. 12 gr., 14 lb. 9 oz. 17 pwt. 23 gr., 15 lb. 7 oz. 15 pwt. 20 gr.
4. From 19 A. 35 rd. 18 yd. take 12 A. 65 rd. 25 yd.
5. I bought a bill of goods amounting to \$985.60, from which was deducted 5%. Find the percentage allowed and the amount paid.
6. What part of a week is 5 da. 14 hr. 24 min.?
7. Reduce $\frac{1}{2}$ of a mill to the decimal of a dollar.
8. Add $\frac{5}{7}$ wk. $\frac{3}{8}$ da. $\frac{2}{5}$ hr.
9. What per cent is gained by buying an article for \$1.75 and selling it for \$2.25?
10. What is the value of $\frac{9\frac{7}{11}}{12\frac{2}{7}}$ of a dollar?

XC**Oral.**

Rapidly multiply :

bu.	pk.	bu.	pk.	pk.	qt.	pk.	qt.	qt.	pt.
4	1	5	2	3	4	8	2	6	3
<u>3</u>		<u>4</u>		<u>4</u>		<u>6</u>		<u>5</u>	

1. At 4¢ a pint, how much will 2 qt. of milk cost?
2. At 16¢ a yard, how much will $2\frac{1}{4}$ yd. of ribbon cost?
3. How many inches long is a blackboard that is $1\frac{1}{2}$ yd. long?
4. If $2\frac{1}{2}$ yd. of velvet cost \$2.40, how many yards can I buy for \$4.80?
5. A grocer sold 1 pk. 6 qt. of pears from a bushel basket. How much remained?

Rapidly multiply :

pwt.	gr.	oz.	pwt.	gal.	qt.	qt.	pt.	gal.	pt.
8	5	6	4	7	2	4	5	4	2
4		5		8		3		6	

6. If 4 men can do a piece of work in 7 da., how long will it take 16 men at the same rate?

7. A can do a piece of work in 5 da. and B in 3 da. How long will it take them if both work together at these rates?

8. 24 is $\frac{4}{5}$ of what number? 32 is 40 % of what number?

9. A principal of a school is allowed \$200 for repairs. He spends only 40 % of it. How much does he save for the city?

10. A farmer raised 300 bu. of wheat, and sold $66\frac{2}{3}$ % of it. How many bushels did he sell? How many bushels had he left?

Written.

1. Simplify $\frac{4\frac{2}{3} + 5\frac{1}{2}}{9\frac{3}{4} - 4\frac{2}{3}} \times \frac{\frac{2}{5} \times 2\frac{1}{6}}{130}$.

2. If a man walks 17 mi. 300 rd. in each of 21 da., what distance does he walk in that time?

3. If 48 sacks of coffee weigh 2 T. 7 cwt. 62 lb., what is the weight of each sack?

4. How many bottles, each holding 2 qt. 1 pt. 1 gi., can be filled from a cask containing $40\frac{1}{2}$ gal. of wine?

5. At \$1.40 a gallon, how much will 5 casks, each containing 28 gal. 1 qt. 1 pt., cost?

6. Simplify $\frac{3\frac{1}{2} - (\frac{2}{3} \times 4.2)}{\frac{5}{18} + \frac{2}{3}}$.
7. Multiply 49 gal. 2 qt. 1 pt. by 12.
8. A miner sends 27 lb. 10 oz. 17 pwt. 16 gr. of gold to his 8 sisters. How much does each receive?
9. 72 is $37\frac{1}{2}\%$ of what number?
10. A dealer bought 7 T. 15 cwt. 56 lb. of salt at \$8.75 a ton, and sold all at $\frac{1}{2}\%$ a pound. How much did he gain?

XCI

Oral.

Rapidly divide:

24 by 4	56 by 8	45 by 9	72 by 8	40 by 8
56 by 7	72 by 9	72 by 12	36 by 9	27 by 3
88 by 11	28 by 7	42 by 7	49 by 7	55 by 5

Subtract by 3's from 100. Subtract by 3's from 72.

1. A shepherd having 240 sheep lost $16\frac{2}{3}\%$ of them in a storm. How many sheep had he left?
2. What part of 72 is 48?
3. What part of $\frac{1}{2}$ is $\frac{1}{4}$?
4. How many cubes, each equal to a cubic foot, are equal in size to a block 40 ft. long, 3 ft. wide, and 2 ft. thick?
5. At 20¢ a quart, how much will 3 gal. of molasses cost?

Rapidly divide:

68 by 2	468 by 2	96 by 4	264 by 11	72 by 3
112 by 4	306 by 9	308 by 6	69 by 3	76 by 4
238 by 3	84 by 4	87 by 5	207 by 3	136 by 4

Subtract by 4's from 96. Subtract by 3's from 72.

6. If a rope 200 ft. long shrinks 5 % when wet, how long is it when wet?

7. A man who worked for \$ 24 a week had his salary reduced $12\frac{1}{2}$ %. How much was it after the reduction?

8. What part of 84 is 16?

9. What part of $\frac{5}{8}$ is $\frac{3}{8}$?

10. How many rods are there in the perimeter of a rectangular field 80 rd. long and 40 rd. wide?

Written.

1. An article weighs 120 lb. (avoir.). What would be its weight by Troy weight?

2. A can do a piece of work in 4 da., B in 3 da., and C in 5 da. How long will it take them working together?

3. How many square feet of lumber will be required for the floors of a house containing 2 rooms (15 ft. by 19 ft.), 5 rooms (14 ft. by 16 ft.), and 3 rooms (12 ft. by 15 ft.)?

4. How much will it cost to carpet a room 19 ft. 6 in. by 13 ft. 4 in., with carpet 40 in. wide, at \$ 2 a yard?

5. Multiply $\frac{62\frac{1}{2}}{1000}$ by 25 millionths and divide the product by 125 hundred thousandths.

6. Change 20 lb. 8 oz. 12 pwt. to avoirdupois weight.

7. A merchant bought 25 doz. buttons at 75¢ a dozen, and sold them at \$1.35 a dozen. What per cent did he gain?

8. How many tiles 10 in. square will lay a floor 31 ft. 8 in. by 22 ft. 6 in.?

9. If it costs \$72 to carpet a room 24 ft. by 18 ft., how much will it cost to carpet a room 36 ft. by 27 ft. with the same material?

10. A grocer in packing 6 dozen dozen eggs, broke half a dozen dozen, and sold the remainder at 20¢ a dozen. How much did he receive for them?

XCII

Oral.

Rapidly divide:

$\frac{2}{3} \div 6$	$8 \div \frac{4}{5}$	$\frac{1}{2} \div \frac{2}{3}$	$1\frac{1}{2} \div 6$	$1\frac{1}{2} \div \frac{3}{4}$
$\frac{5}{8} \div 25$	$10 \div \frac{5}{7}$	$\frac{3}{8} \div \frac{2}{3}$	$1\frac{1}{8} \div 8$	$1\frac{1}{8} \div \frac{4}{5}$
$\frac{6}{7} \div 12$	$12 \div \frac{2}{3}$	$\frac{3}{4} \div \frac{6}{7}$	$4 \div 1\frac{1}{3}$	$\frac{3}{8} \div 1\frac{1}{3}$
$\frac{3}{4} \div 9$	$24 \div \frac{6}{7}$	$\frac{3}{8} \div \frac{4}{5}$	$9 \div 1\frac{1}{2}$	$\frac{1}{2} \div 1\frac{1}{4}$

. Subtract by 6's from 100. Subtract by 6's from 80.

$$5 \times 4, +3, -2, +7, \times 4, +8 = ? \quad 7 \times 8, -5, +3, \times 2, -4, +5 = ?$$

1. Ten gallons of ink at 20¢ a pint will cost how much?

2. I had \$600 and spent \$400. What per cent of my money did I spend?

3. How many days are there from Sept. 9 to Nov. 8?

4. I bought a cow for \$40 and sold it for \$80. What was the gain per cent?

5. Change $\frac{3}{4}$ bu. to quarts.

Rapidly divide:

$\frac{1}{2} \div 4$	$5 \div \frac{5}{9}$	$\frac{2}{3} \div \frac{4}{5}$	$1\frac{1}{2} \div 3$	$1\frac{1}{2} \div \frac{1}{2}$
$\frac{2}{3} \div 8$	$8 \div \frac{2}{3}$	$\frac{5}{4} \div \frac{5}{8}$	$1\frac{1}{3} \div 4$	$1\frac{1}{3} \div \frac{1}{4}$
$\frac{3}{4} \div 6$	$6 \div \frac{3}{4}$	$\frac{3}{8} \div \frac{3}{4}$	$8 \div 1\frac{1}{3}$	$\frac{2}{5} \div 1\frac{1}{3}$
$\frac{4}{5} \div 4$	$4 \div \frac{4}{5}$	$\frac{2}{3} \div \frac{5}{8}$	$12 \div 1\frac{1}{2}$	$\frac{3}{4} \div 1\frac{1}{2}$

6. Which is greater, $\frac{2}{7}$ or $\frac{8}{21}$? Find the difference between them.

7. At 3¢ a pint, how much will 10 gal. 2 qt. of milk cost?

8. I sold a blank book for 8¢ and lost 2¢. What per cent did I lose?

9. John had 2 quarters, 5 dimes, and a nickel. How many apples could he buy at 5¢ each?

10. How many days are there between March 12 and April 15?

Written.

1. How much will it cost to plaster a room 18 ft. by 16½ ft., 9 ft. high, at 22¢ a square yard?

2. A speculator bought 50 A. of land at \$50 per acre, and sold it in villa lots of 5 rd. by 4 rd., at \$150 a lot. How much did he gain by the operation?

3. What time elapsed from 16 min. past 10 o'clock A.M., July 4, 1909 to 22 min. before 8 o'clock P.M., Dec. 12, 1911?

4. How many revolutions will a carriage wheel, which is 3½ ft. in diameter, make in going 5.73 mi.?

5. What part of $\frac{12\frac{1}{2}}{\frac{4}{7}}$ is $\frac{\frac{2}{3} \text{ of } \frac{3}{4}}{\frac{1}{2}}$?

6. At 28¢ a yard, how much will it cost to plaster the walls of a room 12 ft. 11 in. square, 9 ft. 3 in. high, if allowance is made for 2 windows and 1 door, each 6 ft. 2 in. by 2 ft. 4 in.?

7. A note dated May 28, 1910 was paid Feb. 10, 1911. How many days did it run?

8. What is the area of a circle the circumference of which is 160 yd.?

9. If 28 men build a bridge in $5\frac{1}{8}$ da., how many men could build it at the same rate in $2\frac{3}{8}$ da.?

10. A man spends $\frac{2}{5}$ of his salary in board for himself and family, — $\frac{1}{10}$ of it for his wife's clothing, $\frac{1}{5}$ as much for his own clothing as for his wife's, $\frac{1}{2}$ as much for his daughter's clothing as for his own, and $\frac{1}{4}$ as much for his son's clothing as for his daughter's. He saves \$115. How much is his salary?

XCIH

Oral.

Rapidly divide:

6 by 1.2	1.2 by 40	.8 by .02	1.4 by .7	2.4 by .06
8 by .4	2.4 by 60	.6 by .03	2.4 by .4	3.2 by .08
3.2 by 80	.08 by .4	4.8 by .6	4.8 by 60	16 by .04

12 is $\frac{2}{3}$ of what number? 24 is .25 of what number?
 32 is $66\frac{2}{3}\%$ of what number?

1. If $33\frac{1}{3}\%$ of the number of bushels in a bin is 20, how many bushels are there in the bin?

2. Sixty dollars is 30% of the sum I have in bank. How much have I on deposit?

3. What is 250% of $\frac{1}{4}$?

4. How much will it cost to fence a field $\frac{3}{4}$ mi. square, at 25¢ a rod?

5. What is the area of a triangular plot of ground with a base of 26 ft. and an altitude of 15 rd.?

Rapidly divide:

24 by .2	3.6 by .9	4.2 by 60	4.8 by 80	12 by .40
24 by .3	3.6 by .9	.42 by 60	.48 by 80	1.6 by 40
3.6 by .09	4.2 by .6	4.8 by .8	.48 by .6	24 by .03

32 is $\frac{1}{4}$ of what number? 16 is .80 of what number?
15 is 60% of what number?

6. How much will 2 qt. 1 pt. of sirup cost, at \$1.04 a gallon?

7. After cutting off 6 yd. from a piece of goods, 14 yd. remain. What per cent remains?

8. I owned 40 A. of land and sold 25% of it. How many acres did I sell?

9. A boy bought 15 marbles, which was 60% of what he already had. How many had he at first?

10. What is the surface of a table 4 ft. wide and 6.25 ft. long?

Written.

A parlor has the following dimensions: length 36 ft., width 27 ft., height 12 ft. There is a door 8 ft. by 8 ft., and there are two windows, each 5 ft. by 6 ft.

1. How much will it cost to carpet this parlor with carpet $\frac{3}{4}$ yd. wide, at \$.90 a yard?

2. How much will it cost to plaster the walls and ceiling of this parlor, at 20¢ a square foot, after deducting for the door and windows?

3. How much will it cost to paper this parlor, at \$.25 a single roll?

4. What would be the cost of putting a molding around the room, at 5¢ a foot?

5. A certain sum of money is divided among 4 persons. A has $\frac{1}{4}$, B $\frac{1}{6}$, C $\frac{1}{8}$, and D the remainder, which is \$39. How much more has A than D?

6. How many panels of fence 8 ft. long will it take to fence a pasture 32 rd. by 16 rd., and how much will they cost at \$.25 a panel?

7. What is the cost of wainscoting a room 27 ft. by 18 ft., with wainscoting 4 ft. 6 in. high, at \$.40 a square foot?

8. How much will it cost to line a tank $16\frac{1}{2}$ ft. by $15\frac{1}{4}$ ft., 3 ft. 4 in. deep, with zinc at 16¢ a pound, if 5 lb. are allowed to the square foot?

9. How many bulbs 7 in. apart can I plant in a garden 28 ft. by 14 ft.? (Make a diagram.)

10. A man bought 35 bu. of barley and sold it for \$30. He made \$5.50 in the trade. How much per bushel did he pay?

XCIV

Oral.

Rapidly divide:

bu.	pk.	gal.	qt.	pk.	qt.	gal.	pt.	qt.	pt.
6)4	2	3)2	1	4)3	4	6)2	2	3)4	1

Subtract by 6's from 92; from 73.

24 is $\frac{1}{3}$ more than what number? 12 is .20 more than what number? 48 is $14\frac{2}{7}\%$ more than what number?

1. Thirty dollars is 25 % more than I paid for an overcoat. How much did it cost me?
2. What number increased by $12\frac{1}{2}$ % of itself equals 81?
3. I have $2\frac{1}{4}$ A. of land. Into how many building lots can I divide them if each lot contains $\frac{3}{8}$ A.?
4. How many inches are there in .5 of a yard?
5. Twenty-five miles is .5 of the distance between two places. Find the distance.

Rapidly divide :

bu.	pk.	gal.	qt.	gal.	pt.	pk.	qt.	lb.	oz.
2)3	2	5)3	3	7)6	1	4)6	4	8)12	8

Subtract by 7's from 85; from 63.

6. Twenty-seven dollars is 50 % more than I paid for a clock. How much did I pay for it?
7. Eighteen dollars is $12\frac{1}{2}$ % more than I paid for a chair. How much did the chair cost me?
8. A man had \$5000. He spent 50 % of it for a house, 25 % of it for furniture, and 15 % of it for a horse and carriage. How much money had he left?
9. Five eighths equals what per cent of $\frac{3}{4}$?
10. If \$1.20 will buy $1\frac{1}{2}$ yd. of velvet, how many yards can I buy for \$1?

Written.

1. The longitude of Rome is $12^{\circ} 27'$ E. and of San Francisco $122^{\circ} 26' 15''$ W. Find the distance between them.
2. A cistern 7 ft. long, 6 ft. wide, and 4 ft. deep is to be lined with zinc costing 12¢ a pound. What will be the cost if an allowance of 5 lb. to the square foot is made?

3. How many cubic feet of air are there in a room 24 ft. 9 in. by 18 ft. 4 in. and 10 ft. 8 in. high?

4. At 57¢ a load, how much will it cost to remove the earth from the cellar of a house 48 ft. 9 in. by 32 ft. and 9 in. deep?

5. Mr. Caldwell spent $12\frac{1}{2}\%$ of his money for a horse that cost him \$140. How much money did he have?

6. In a schoolroom 30 ft. long, 20 ft. wide, and 10 ft. high there are 50 persons, each breathing 10 cu. ft. of air a minute. In how long a time will they breathe as much as the room contains?

7. How much will it cost to build a wall 30 ft. by 15 ft. by $1\frac{1}{4}$ ft., at \$14 a perch?

8. The longitude of Bombay is $72^{\circ} 54'$ E. and that of Berlin, $13^{\circ} 23' 45''$ E. Find the distance in degrees, etc. between these cities.

9. A man sold 19 bu. of rye and 23 bu. of barley for \$44.85. He received for the rye 15¢ more per bushel than for the barley. What was the price of each per bushel?

10. A man bought a house for \$2800, which was 35 % of his capital. Find his capital.

XCV

Oral.

Rapidly find the results:

$$\begin{array}{r} 4 \times 46 \\ 23 \end{array} \quad \begin{array}{r} 32 \times 67 \\ 96 \end{array} \quad \begin{array}{r} 36 \times 14 \\ 9 \end{array} \quad \begin{array}{r} 15 \times 48 \\ 16 \end{array} \quad \begin{array}{r} 67 \times 36 \\ 18 \end{array} \quad \begin{array}{r} 42 \times 23 \\ 21 \end{array}$$

1. A farmer raised 50 bu. of cranberries and sold 60 % of them. How many bushels did he sell ?
2. What per cent of 20 is 9 ?
3. I spent \$45 for a watch, which was 25 % more than I paid for a chain. How much did the chain cost me ?
4. A man puts up $3\frac{1}{2}$ lb. of spice into 4-oz. packages. How many packages does he make ?
5. A floor containing $40\frac{1}{4}$ sq. yd. is 7 yd. long. How wide is it ?

Rapidly find the results:

$$\begin{array}{r} 44 \times 17 \\ 34 \end{array} \quad \begin{array}{r} 33 \times 12 \\ 99 \end{array} \quad \begin{array}{r} 32 \times 82 \\ 41 \end{array} \quad \begin{array}{r} 12 \times 43 \\ 24 \end{array} \quad \begin{array}{r} 25 \times 18 \\ 36 \end{array} \quad \begin{array}{r} 37 \times 16 \\ 8 \end{array}$$

6. A grocer bought 125 doz. eggs and found 20 % of them bad or broken. How many eggs were bad or broken ?
7. What per cent of a day is 8 hr. ?
8. Forty-nine is $16\frac{2}{3}$ more than what number ?
9. Ten bushels and one peck of seed are packed in 8 bags. How much is there in each bag ?
10. How many quarts and pints are there in $\frac{3}{8}$ gal. ?

Written.

1. The longitude of New York is $74^{\circ} 3''$ W. and of Berlin, $13^{\circ} 23' 45''$ E. What is the distance between them ?
2. Find your exact age in years, months, and days.
3. How much will it cost to dig a cellar 30 ft. long, 28 ft. wide, and 6 ft. deep, at 35¢ a load ?

4. A merchant paid \$3465 for a store, which was 15% more than he paid for his house. How much did he pay for his house?

5. Simplify $\left(1 + \frac{1 + \frac{1}{5}}{5}\right) + \left(1 + \frac{5}{1 + \frac{1}{5}}\right)$.

6. How much will it cost to carpet a room 25 ft. by 20 ft. with carpet $\frac{3}{4}$ yd. wide, at \$2 a yard?

7. A wheel is 12 ft. 4 in. in circumference. How many revolutions will it make in rolling a mile and a half?

8. If I receive only \$58.50 from a debtor who owes me \$90, what per cent do I lose on the debt?

9. A farm was sold for \$5832, which was 8% more than it cost. Find the cost.

10. Simplify $\frac{4\frac{3}{4} - 1\frac{3}{4}}{4\frac{3}{4} \times 5\frac{3}{4}}$.

XCVI

Oral.

Rapidly find:

$\frac{5}{8}$ of	$\left\{ \begin{array}{l} 24 \\ 72 \\ 48 \\ 56 \\ 80 \\ 40 \\ 16 \\ 32 \end{array} \right.$	$\cdot 16\frac{2}{3}$ of	$\left\{ \begin{array}{l} 12 \\ 24 \\ 36 \\ 42 \\ 18 \\ 48 \\ 72 \\ 60 \end{array} \right.$	$12\frac{1}{2}\%$ of	$\left\{ \begin{array}{l} 72 \\ 120 \\ 56 \\ 64 \\ 16 \\ 32 \\ 40 \\ 48 \end{array} \right.$	$14\frac{2}{3}\%$ of	$\left\{ \begin{array}{l} 28 \\ 35 \\ 56 \\ 70 \\ 14 \\ 21 \\ 42 \\ 63 \end{array} \right.$
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Subtract by 8's from 96. Subtract by 8's from 72.

1. The dividend is $4\frac{1}{2}$ and the quotient is $\frac{2}{3}$. Find the divisor.
2. Sixteen is 80 % of what number?
3. At the rate of $3\frac{1}{2}$ lb. of coffee for $\$ \frac{7}{8}$, how many pounds can I buy for \$5?
4. If 4 boys can earn $\$3\frac{1}{5}$ in a week, how much does each boy earn, their earnings being equal?
5. James earned \$30 last week, which was 20 % more than he earned the week before. How much did he earn the week before?

Rapidly find :

$\frac{3}{4}$ of	$\left\{ \begin{array}{l} 20 \\ 28 \\ 36 \\ 16 \end{array} \right.$	$\frac{1}{2}$ of	$\left\{ \begin{array}{l} 48 \\ 32 \\ 80 \\ 96 \end{array} \right.$	$8\frac{1}{8}$ % of	$\left\{ \begin{array}{l} 60 \\ 72 \\ 96 \\ 84 \end{array} \right.$	$37\frac{1}{2}$ % of	$\left\{ \begin{array}{l} 32 \\ 24 \\ 40 \\ 80 \end{array} \right.$
	$\left\{ \begin{array}{l} 24 \\ 32 \\ 40 \\ 12 \end{array} \right.$		$\left\{ \begin{array}{l} 64 \\ 112 \\ 160 \\ 192 \end{array} \right.$				$\left\{ \begin{array}{l} 16 \\ 56 \\ 48 \\ 72 \end{array} \right.$

Subtract by 7's from 100; from 56.

6. Find the difference between $1\frac{1}{2}$ and .05.
7. How much will 14 lb. of cloves cost if $3\frac{1}{2}$ lb. can be bought for \$1.50?
8. How far will a man walk in $5\frac{1}{8}$ hr. at the rate of 21 mi. in $3\frac{1}{2}$ hr.?
9. How much will it cost to dig a cellar 27 ft. by 18 ft., 3 ft. deep, at 50¢ a cubic yard or load?
10. I put \$10 in the bank, which was 20 % of what I already had there. How much have I now in the bank?

Written.

1. How many cords are there in a pile of wood 150 ft. long, 4 ft. wide, and 4 ft. high?

2. Find the height of a pile of wood containing $28\frac{3}{4}$ cd., if it is 20 ft. long and 16 ft. wide.

3. How many gallons of water are there in a cistern 3 ft. wide, 4 ft. long, and 11 ft. deep?

4. At 80¢ a bushel, what is the value of a bin full of wheat measuring 12.6 ft. long, 7 ft. wide, and 4 ft. deep?

5. A certain man's income was \$1800 a year, and his expenses were \$1200. What per cent of his income were his expenses?

6. I paid \$4 a cord for wood which made a pile 20 ft. high by 44 ft. long by 32 ft. wide. How much did it cost me?

7. How many bricks 8 in. by 4 in. by $2\frac{1}{2}$ in. are required to build the front of a house the wall of which is 30 ft. long, 24 ft. wide, and 2 ft. thick, if an allowance of $\frac{1}{4}$ of the surface is made for doors and windows?

8. If a reservoir 45 ft. long and 28 ft. wide contains 2520000 gal., how deep is it?

9. What must be the length of a bin 8 ft. wide and 5 ft. deep to contain 325 bu.?

10. Mr. Brown and Mr. Smith engaged in partnership. Mr. Brown invested \$2460 and Mr. Smith, \$2740. What per cent of the capital of the firm did each invest?

XCVII**Oral.**

Rapidly find the per cent that

12 is of 24	36 is of 48	50 is of 60	12 is of 20
27 is of 36	15 is of 25	35 is of 50	20 is of 42

1. What will be the cost of lining cloth 24 yd. by $\frac{7}{8}$ yd. with silk $\frac{7}{8}$ yd. wide, at 50¢ a yard?

2. How many yards of carpet a yard wide will cover a floor 18 ft. by 15 ft.?

3. If 5 yd. of cloth cost \$1.20, how much will $\frac{5}{8}$ yd. cost?

4. A pole stands so that 25% of it is in mud and $12\frac{1}{2}\%$ of it in water. The remainder, which is 36 ft., is above the water. What is the length of the pole?

5. Fifteen dollars earned per week is at the rate of how much per day (six working days)?

Rapidly find the per cent that

20 is of 50	8 is of 24	32 is of 40	32 is of 56
14 is of 18	7 is of 49	18 is of 27	25 is of 45

6. One third of a foot added to $\frac{1}{4}$ of a foot lacks how much of being 1 ft.?

7. Three fourths is what decimal part of 2?

8. John has \$30 in the bank; Mary has $16\frac{2}{3}\%$ as much. How much has Mary?

9. I bought a house for \$4000 and sold it for 80% of the cost. For how much did I sell it?

10. A family uses $3\frac{1}{2}$ lb. of sugar per day. How long will a bag containing $24\frac{1}{2}$ lb. last?

Written.

1. How much will it cost to excavate a cellar 3 ft. by 25 ft. and 9 ft. deep, at \$1.20 per cubic yard?
2. Find the cost of 928 ft. of pine boards, at \$45 per thousand feet.
3. At 35¢ per square yard, how much will it cost to plaster the four sides of a room 25 ft. by 30 ft. by $12\frac{1}{2}$ ft., if no allowances are made for doors or windows?
4. Two men 84.675 mi. apart traveled until they met each other, when they found that one had traveled 8.425 mi. farther than the other. How far did each travel?
5. Divide .000024 by .04; multiply the quotient by .016.
6. How much will 1650 lb. of coal cost at \$6.80 per ton?
7. How much will it cost to carpet a floor 21 ft. by 18 ft. with carpet $\frac{3}{4}$ yd. wide, at \$1.10 a yard?
8. What per cent of 75 is 16?
9. A room had 3 windows, which were curtained with brocatelle $\frac{1}{2}$ yd. wide. Ten yards were required for each window at \$1.50 a yard, and the curtains were lined with silk $\frac{5}{8}$ yd. wide at $87\frac{1}{2}$ ¢ a yard. Find the total cost.
10. A man left $\frac{1}{3}$ of his estate to his wife, $\frac{1}{2}$ of it to his two sons, and $\frac{1}{2}$ of the remainder to his nephew, who received \$400. Find the value of the estate.

XCVIII**Oral.**

Rapidly find the number of which

25 is $\frac{5}{8}$	30 is .6	50 is 25 %	18 is 20 %
24 is $\frac{3}{4}$	27 is .9	28 is 80 %	24 is $12\frac{1}{2}$ %
18 is $\frac{3}{4}$	32 is .8	56 is $87\frac{1}{2}$ %	85 is 85 %

1. How much will it cost to carpet a room 8 yd. by 6 yd. with carpet $\frac{3}{4}$ yd. wide, at \$1 a yard?
2. How many yards of lining $\frac{4}{5}$ yd. wide will line goods 15 yd. by $\frac{3}{4}$ yd.?
3. How many cubic feet are there in a room 18 ft. long, 8 ft. wide, and 10 ft. high?
4. Find the cost of 10 T. of hay at \$12.50 a ton.
5. How many rods of fence will inclose a quarter section of land? (Make a diagram.)

Rapidly find the number of which

12 is $\frac{1}{3}$	60 is .5	25 is $12\frac{1}{2}\%$	38 is 50%
20 is $\frac{1}{5}$	45 is .9	32 is $16\frac{2}{3}\%$	12 is $12\frac{1}{2}\%$
16 is $\frac{2}{3}$	36 is .6	40 is $8\frac{1}{3}\%$	22 is 25%

6. How many yards of carpet a yard wide will cover a floor 18 ft. by 12 ft.?
7. If a section of land (1 sq. mi.) is divided equally among 10 men, how many acres does each man receive?
8. From a section of land there were sold 240 A. How many acres remained?
9. If 8 men can do a piece of work in 18 da., how long will it take 16 men to do it?
10. If 6 score and 8 apples are divided equally among 16 people, how many apples will each person have?

Written.

1. Two pairs of curtains are each $5\frac{1}{2}$ yd. long and $2\frac{1}{4}$ yd. wide. How much will it cost to line them with material $1\frac{1}{2}$ yd. wide, at \$.80 a yard?

2. At \$1.25 a yard, find the cost of a carpet, 27 in. wide, for a room 18 ft. long and 15 ft. wide.

3. How much will it cost to flag a sidewalk 312 ft. long and $6\frac{1}{2}$ ft. wide, at \$2.70 a square yard?

4. How much will it cost to dig a cellar 24 ft. long, 18 ft. wide, and 6 ft. deep, at 54¢ a cubic yard or load?

5. A man spent $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{5}$ of his money, and had \$1400 left. How much money had he at first?

6. How much will it cost to line goods $18\frac{1}{2}$ yd. by 12 yd., with material 27 in. wide, at \$1.62 $\frac{1}{2}$ a yard?

7. A parlor is 15 ft. by 19 ft. 6 in., and I wish to cover it with Brussels carpet 27 in. wide. How much will it cost me at \$1.50 a yard?

8. A tank 7 ft. by 4 ft. by 2 ft. is half filled with oil. How many gallons of oil are there in the tank?

9. A hatter imported fur hats at \$75 per dozen. At what price must he retail them to make 32%?

10. Simplify $\frac{\frac{6}{11}}{\frac{7}{8} \text{ of } \frac{1}{3}}$.

XCIX

Oral.

Rapidly find the number than which

16 is $\frac{1}{3}$ more 25 is .25 more 48 is 14 $\frac{2}{3}$ % more

12 is 20% more 18 is $\frac{1}{3}$ more 20 is 33 $\frac{1}{3}$ % more

1. At 50¢ each, how many baseballs can I buy for \$4?

2. If $\frac{3}{4}$ of a ton of hay is worth \$4 $\frac{1}{2}$, how much will

10 T. cost at the same rate?

3. From \$2 $\frac{1}{2}$ take 2 $\frac{1}{2}$ ¢. 4. Find .03 of $\frac{1}{4}$.

5. Henry gave his sister 20¢, which is $\frac{4}{5}$ of what he had at first, and $\frac{1}{2}$ of what his sister now has. How much had each at first?

Rapidly find the number than which

12 is $\frac{1}{3}$ more	16 is $.14\frac{2}{3}$ more	20 is $11\frac{1}{3}\%$ more
24 is 50 % more	12 is $\frac{1}{2}$ more	16 is $.33\frac{1}{3}\%$ more

6. A man had \$25. He spent \$5 $\frac{1}{2}$ and \$3 $\frac{1}{4}$. How much had he left?

7. Find $16\frac{2}{3}\%$ of \$600.

8. Find the difference between .25 and .2 of .3.

9. Reduce $5\frac{2}{3}$ to a decimal.

10. Jane having 50 beads, lost $\frac{4}{5}$ of them, and then found $\frac{2}{3}$ as many as remained. How many had she then?

Written.

1. Find the capacity in gallons of a milk can 7 in. in diameter and 30 in. in height.

2. A man sold corn at the rate of 62 $\frac{1}{2}$ ¢ a bushel, receiving \$175 for it. How many bushels did he sell?

3. I bought 8 bu. of chestnuts at \$6.25 a bushel, and sold them at 8¢ a pint. How much did I gain?

4. A farmer traded 6 $\frac{3}{4}$ lb. of butter at 36¢ a pound for 1 $\frac{1}{4}$ gal. of olive oil. How much was the oil worth a gallon?

5. A town 6 $\frac{1}{2}$ mi. wide and 7 $\frac{1}{2}$ mi. long equals how many farms of 120 A. each?

6. If $\frac{7}{8}$ of my money is \$3612, how much money have I?

7. At 60¢ a square yard, how much will it cost to plaster a room 40 ft. by 30 ft., and 10 $\frac{1}{2}$ ft. high, if an allowance is made of 125 sq. ft.?

8. How much time has elapsed since the date of the signing of the Declaration of Independence?

9. Divide .048 by 600.

10. Find the diameter of a circle whose circumference is 400 ft.

C

Oral.

Rapidly find the number than which

24 is $\frac{1}{3}$ less 98 is .02 less 25 is $16\frac{2}{3}\%$ less 48 is $14\frac{2}{3}\%$ less
 16 is $\frac{1}{7}$ less 18 is .25 less 32 is $11\frac{1}{5}\%$ less 56 is $12\frac{1}{2}\%$ less
 15 is $\frac{1}{8}$ less 95 is .05 less 28 is $12\frac{1}{2}\%$ less 15 is $16\frac{2}{3}\%$ less

1. A shepherd having 100 sheep, sold $\frac{1}{5}$ of them at \$30 each. How much did he receive for them?

2. If tea is worth $\$ \frac{3}{4}$ a pound, what part of a pound can be bought for 50¢?

3. How much will 48 chairs cost at \$1.50 each?

4. How many square yards are there in a rectangular field 36 yd. long and 25 yd. wide?

5. One peck and one quart is what part of a bushel?

Rapidly find the number than which

80 is $\frac{2}{3}$ less 24 is .8 less 16 is $83\frac{1}{3}\%$ less 48 is $14\frac{2}{3}\%$ less
 40 is $\frac{1}{3}$ less 35 is .8 less 25 is $16\frac{2}{3}\%$ less 10 is $87\frac{1}{2}\%$ less
 20 is $\frac{2}{3}$ less 36 is .4 less 12 is $42\frac{2}{3}\%$ less 25 is $37\frac{1}{2}\%$ less

6. If you divide 7 qt. 1 pt. of milk equally among 5 people, how many quarts and pints will each receive?

7. John lost $\frac{1}{4}$ of his money and had 96¢ left. How much had he at first?

8. Twenty-eight is $\frac{4}{5}$ of $\frac{5}{8}$ of what number?
9. How much is the rent of a house for 1 yr. 8 mo. at \$36 a month?
10. A room that is 36 ft. long and 30 ft. wide contains how many square yards of floor?

Written.

1. At \$1.60 per hundred board feet, find the cost of 4 boards, each 32 ft. by 10 in., and 14 in. thick.
2. At \$15 per thousand board feet, find the cost of 8 planks, each 12 ft. by 14 in., and 8 in. thick.
3. At 45¢ a square yard how much will it cost to cement the floor of a cellar 48 ft. 6 in. by 27 ft.?
4. A grocer paid \$9.80 for a barrel of flour, and sold it for 7¢ a pound. How much did he gain?
5. What number diminished by $\frac{2}{3}$ and $\frac{3}{4}$ of itself leaves a remainder of 480? _____
6. At \$2 $\frac{1}{4}$ per hundred, how much will 10 boards, each 15 ft. by 16 in., and 3 $\frac{1}{2}$ in. thick, cost?
7. At \$2 $\frac{1}{2}$ per hundred, find the cost of 36 boards, each 12 ft. by 11 in.
8. At 25¢ a pound, how much will it cost to line a tank 6 $\frac{1}{2}$ ft. by 5 $\frac{3}{8}$ ft. and 5 ft. deep, if an allowance of 4 lb. to the square foot is made?
9. Milton was born Dec. 9, 1608, and died Nov. 8, 1674. How old was he at the time of his death?
10. A farmer who had sold 110 A. 43 sq. rd. of land had 80% of his land left. How much had he at first?

TABLES

DRY MEASURE

2 pints (pt.) = 1 quart (qt.)
 8 quarts = 1 peck (pk.)
 4 pecks = 1 bushel (bu.)
 64 pints } = 1 bushel
 32 quarts }
 2150.4 cu. in. = 1 bushel

LIQUID MEASURE

4 gills (gi.) = 1 pint (pt.)
 2 pints = 1 quart (qt.)
 4 quarts = 1 gallon
 31½ gallons = 1 barrel (bbl.)
 63 gallons = 1 hogshead (hhd.)
 231 cu. in. = 1 gallon

LONG MEASURE

12 inches (in.) = 1 foot (ft.)
 3 feet = 1 yard (yd.)
 5½ yd. or 16½ ft. = 1 rod (rd.)
 320 rods = 1 mile (mi.)
 63360 inches }
 5280 feet } = 1 mile
 1760 yards }
 4 inches = 1 hand
 3 feet = 1 pace
 6 feet = 1 fathom

SQUARE MEASURE

144 square inches = 1 square foot
 9 square feet = 1 square yard
 30½ square yards } = 1 square rod
 272½ square feet }
 160 square rods = 1 acre (A.)
 640 acres = 1 square mile
 1 mile square = 1 section of
 land
 36 square miles = 1 township
 100 square feet = 1 square

CUBIC MEASURE

1728 cubic inches = 1 cubic foot
 27 cubic feet = 1 cubic yard
 128 cubic feet = 1 cord
 24½ cubic feet = 1 perch

CIRCULAR MEASURE

60 seconds (") = 1 minute (')

60 minutes = 1 degree (°)

360 degrees = 1 circumference

UNITED STATES MONEY

10 mills (m.) = 1 cent (¢ or ct.)
 10 cents = 1 dime (d.)
 10 dimes = 1 dollar (\$)

ENGLISH MONEY

4 farthings (f.) = 1 penny (d.)
 12 pence = 1 shilling (s.)
 20 shillings = 1 pound or sov-
 ereign (£)

TROY WEIGHT

12 months (mo.) = 1 year

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